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Service Manual

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PRODUCT INFORMATION

CHAPTER 1

[1] PRODUCT DESCRIPTION

The HP 9153/54 A and B Disc Drives (Figure 1-1) are random access data storage devices. The HP 9153 A and B contains a single 3 1/2-inch double-sided flexible drive providing 710 Kbytes (at 512 bytes/sector) of storage capacity and a 3 1/2-inch Winchester disc drive which provides 10Mbytes of storage capacity for the HP 9153A and 20Mbytes for the HP 9153B. The HP 9154 A and B only contains a 3 1/2-inch Winchester disc drive; 10 Mbytes for the HP 9154A and 20Mbytes for the HP 9154B.

There are two versions of the HP 9153/54A product. Units with a SN Prefix of 2515A and lower have a full height 3 1/2-inch floppy drive, two PCA's for the controller, and power supply comprised of a transformer and PCA. Versions of the HP 9153/54A with a S/N prefix of 2702A and higher use a half-height 3 1/2- inch floppy drive, an intrigrated switching power supply, and a single controller PCA that uses surface mount technology. The newer HP 9153/54A's are essentially identical to the HP 9153/54B except that the HP 9153/54A only has a 10Mbyte hard disc capacity.

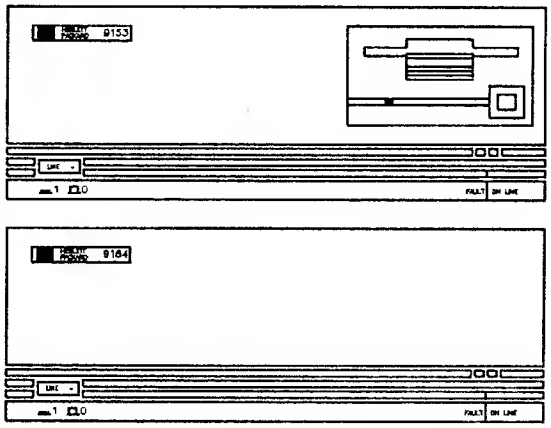


Figure 1-1. HP 9153A and HP 9154A (Front View)

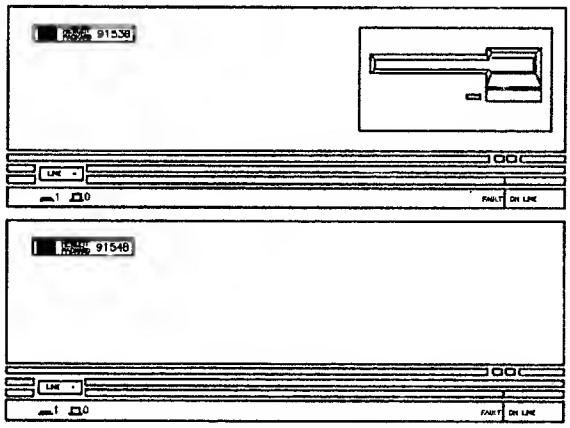


Figure 1-1a. HP 9153/54B and HP 9153/54A (Front View)
S/N prefix 2702A and higher.

[2] SPECIFICATIONS

INTERFACE

IEEE 488-1978 (HP-IB)

PERFORMANCE CHARACTERISTICS

	Double-Sided 3 1/2" Floppy Disc	10Mbyte Winchester	20Mbyte Winchester
Maximum Formatted Capacity:			
HP 150			
Bytes Per Unit	710 KB	10.0 MB	20.07 MB
Bytes per Sector	512	256	256
Sectors per Track	9	28	28
Series 200			
Bytes Per Unit	630 KB	10.0 MB	20.07 MB
Bytes Per Sector	256	256	256
Sectors per Track	16	28	28
Tracks per Surface	80	698	1400
Surfaces per Disc	2	2	2
Tracks per inch	135	1094 (Average)	
Recording Format	MFM	MFM	MFM
Max Sustained Transfer Rate*	17 KB/sec	174KB/sec	174KB/sec
Average Access Time	497 msec	85 msec	75 msec
Maximum Access Time	1.74 sec	150 msec	
Rotational Speed	600 rpm	3000 rpm	3000 rpm

* Mainframe dependent

ENVIRONMENTAL RANGES

	9153A/B	9154A/B
Temperature		
Operating	10 to 40 degrees C (50 to 104 degrees F)	10 to 40 degrees C (50 to 104 degrees F)
Non-Operating	-40 to 60 degrees C (-40 to 140 degrees F)	-40 to 60 degrees C (-40 to 140 degrees F)
Humidity		
Operating (non-condensing) 26 degrees C max wet bulb temperature	20% to 80%	8% to 80%
Non-Operating (non-condensing)	5% to 90%	5% to 90%
Altitude		
Operating	0 to 4572m (0 to 15000 ft)	0 to 4572m (0 to 15000 ft)
Non-Operating	-304 to 1524m (-1000 to 50000 ft)	-304 to 1524m (-1000 to 50000ft)

PHYSICAL CHARACTERISTICS

Size		
Height	106 mm (4.1 in)	
Width	325 mm (12.8 in)	
Depth	295 mm (11.5 in)	
Weight		
Net	9.09kg (20lbs)	8.31kg (18.3lbs)
Shipping	11.79kg (26lbs)	11.34kg (25lbs)

POWER REQUIREMENTS

Voltage (selected by rear panel switch)	86-127VAC (115V) 195-253VAC (230V)	86-127VAC 195-253VAC
Frequency	48-66 Hz	48-66Hz
Power	100W	100W

[3] EQUIPMENT SUPPLIED

Description	Quantity	HP Part Number
Power cord	1	Dependent on location
Fuse	2	2110-0002 (2 AMP, 250 VAC)
		2110-0003 (1 AMP, 250 VAC)
Operator's Manual	1	09153-90000
Shipping Disc	1	1150-1786 (S/N prefix 2515A and lower)
	1	1150-1787 (S/N prefix 2702A and higher)

A package of ten flexible discs has been set up as a product. This product is orderable using the 92192A product number.

[4] SUPPORT STRATEGY

The support strategy for the HP 9153/54 A and B is to the designated field-replaceable assembly level. The following assemblied are supported on the exchange program.

HP 9153/54A S/N Prefix 2515A and Lower

EXCHANGE ASSEMBLIES	HP PART NUMBER
3 1/2-inch disc drive	09114-69511
Controller PCA	09153-69502
3 1/2-inch Winchester disc drive	09153-69121
Power Supply	09153-67501
Fan	09125-68500
HP-IB Module	09153-67503

HP 9153/54A S/N Prefix 2702A and Higher plus the HP 9153/54B

Controller PCA	09153-69530
3 1/2-inch Flexible disc drive	09123-69101
3 1/2-inch Winchester disc drive	45816-69111

NON-EXCHANGE ASSEMBLIES

Power Supply	(New 53/54 A&B)	09153-67110
Fan		09144-68501

[5] SERIAL NUMBER INFORMATION

This manual applies to HP 9153 A and B units having serial numbers prefixed by 2450A and higher and HP 9154 A and B units having serial numbers prefixed by 2451A and higher.

SITE PREPARATION AND REQUIREMENTS

CHAPTER 2

[1] SITE PREPARATION

The following paragraph contains the requirements for proper operation of the HP 9153A/9154A disc drive. Site preparation is normally a customer responsibility.

[2] ENVIRONMENTAL REQUIREMENTS

The HP 9153/54 A and B are designed to operate in the following temperature range:

Temperature	10°C to 40°C(50°F to 104°F)

NOTE

The flexible disc drive in the HP 9153 A and B is designed for operation in a typical office environment. Use of the equipment in an environment containing dirt, dust, or corrosive substances will cause the flexible disc and disc drive life to be drastically reduced.

INSTALLATION AND CONFIGURATION

CHAPTER 3

Information in this chapter applies to the different product versions as follows:

Paragraph No.	Product Version
1 through 4	HP 9153/54A, S/N Prefix 2515A and lower
5 through 6	HP 9153/54A, S/N Prefix 2702A and higher HP 9153/54B, All Serial Numbers

[1] INSTALLATION

The 9153A/54A disc drives are connected to the computer or computing system using one of the HP-IB cables listed in Figure 3-1. Refer to the host Operators Manual for system-specific installation procedures.

Length	HP-IB Accessory Number
0.5 metre	10833D
1 metre	10833A
2 metres	10833B
4 metres	10833C

Figure 3-1. HP-IB Cables.

HP-IB INTERFACE RESTRICTIONS

1. All AC line switches on the disc drives and computing system must be turned "OFF" when connecting and disconnecting disc drives.

2. The total length of cable permitted in one bus system must be less than or equal to two metres times the number of devices connected together (the interface card is considered one device).

3. The total length of the cable must not exceed 20 metres. For example, a system containing six devices can be connected together with cables that have a total length less than or equal to 12 metres (six devices x 2m/device = 12 metres). The individual lengths of cable may be distributed in any manner desired as long as the total length does not exceed the allowed maximum. If more than 10 devices are to be connected together, cables shorter than two metres must be used between some of the devices to keep the total cable length less than 20 metres.

4. The maximum number of devices that can be connected together in one bus system is 15.

There are no restrictions to the way cables may be connected together; however, it is recommended that no more than four piggyback connectors be stacked together on one device. The resulting structure could exert enough force on the connector mounting to damage it.

CAUTION

Disc drive performance and reliability are dependent on the type of media used. Disc drive specifications can be assured only when using HP media. The use of improper media can result in premature disc failure or damage to the disc drive.

CAUTION

Never turn the disc drive off or remove the disc from the flexible disc drive when the disc access light or when the on line LED is on; doing so can cause loss of data.

[2] CONFIGURATION OF STANDARD DRIVE UNIT

VOLTAGE SELECTION AND FUSING

The voltage select switch on the rear panel must be set to the nominal line voltage for the area in which it is operating, Figure 3-2 shows the voltage select switch set for 115 VAC line voltage.

CAUTION

Always turn the AC power switch off or disconnect the AC line cord before changing the line voltage select switch position. Changing the line voltage select switch setting while AC power is on could damage the unit.

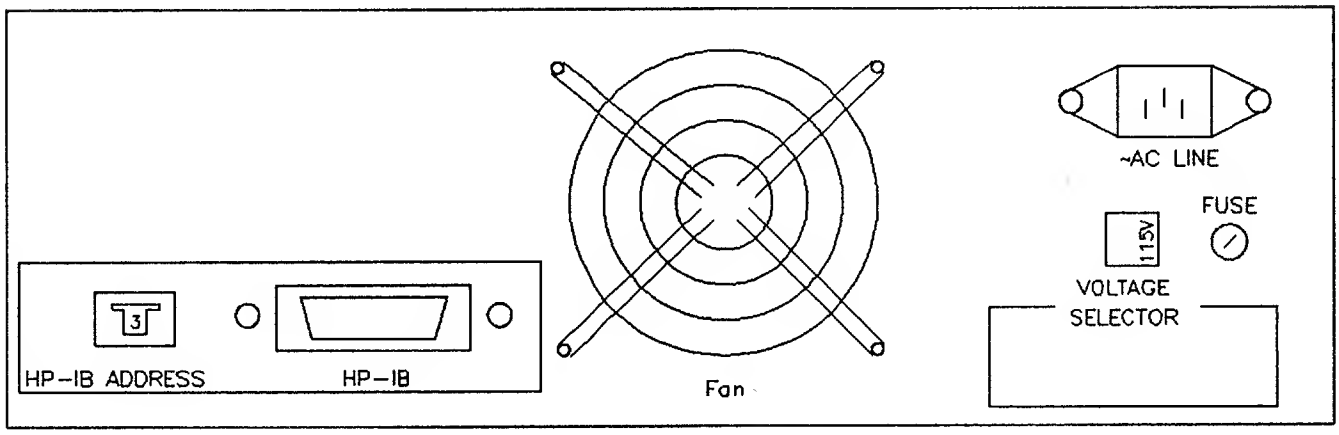


Figure 3-2. HP 9153A and HP 9154A Rear Panel.

A different fuse is required for each of the two voltage ranges of 110-120 and 220-240 VAC. Figure 3-3 gives the correct fuse ratings and part numbers. The fuse included in the HP 9153A/54A depends upon where the equipment is to be delivered.

Setting	Voltage Range	Fuse Rating	HP Part Number
115 VAC	110-125 VAC	2.0 Amp 250 VAC-Normal Blow	2110-0002
230 VAC	200-240 VAC	1.0 Amp 250 VAC-Normal Blow	2110-0001

Figure 3-3. Fuses.

WARNING

ALWAYS DISCONNECT THE DISC DRIVE FROM ANY AC LINE BEFORE CHANGING FUSES.

INTERFACE (PERSONALITY) MODULE

The HP 9153/54A Disc Drives use a removable HP-IB interface module. The use of modules allows for future interfaces to be used.

WRITE PROTECT ERROR ON INITIALIZATION (HP 9153A)

A motor speed check is performed when a flexible disc is inserted into the drive. If the motor speed is outside of the allowed tolerance, a Write Protect Error is generated preventing disc drive operation. If the drive is operating properly, this indicates a defective flexible disc. Discard the disc.

DISC COMPATIBILITY (9153A)

Figure 3-4 shows the recommended usage of single-sided and double-sided flexible discs with the HP 9153A. Words used in the table are defined as follows:

* "Exchange only" means that the disc should be used only for exchanging data and programs with single-sided disc drives, and should not be used on a daily basis.

* "OK" means that the disc may be used on a daily basis.

Single-sided HP disc	exchange only
Double-sided HP media in single-sided format	OK
Double-sided HP media in double-sided format	OK
HP software	OK

Figure 3-4. Usage of Single- and Double-sided Flexible Discs with the 9153A.

[3] CONFIGURATION SWITCHES (S/N Prefix 2515A and Lower)

Switch bank SW1, located on the Controller PCA near the interface connector J2, is used to set the drive configuration (Refer to Figure 7-1). At power up the firmware looks at these switches to determine how many flexible disc drives and/or Winchester drives it should expect. The different selections are as follows:

SWITCH 1234	NUMBER OF HARD DISCS	NUMBER OF FLOPPY DISKS
xxCC	1	1
xCOC	0	2
xOOC	0	1
xCCO	2	0
xOCO	1	0
xxOO	1	1

KEY -
O = OPEN
C = CLOSED
x = don't care

Figure 3-5. Controller Configuration Switches.

HP-IB ADDRESS SWITCH

The HP-IB address switch (see Figure 3-2) is a rotary switch with decimal numbers. This switch setting has the following meanings:

HP-IB switch = 0 through 7	HP-IB address of device is the same as the switch setting. Hard disc= unit 0 Floppy = unit 1
HP-IB switch = 8 or 9	HP-IB address of the device is 0. Hard disc = unit 1 Floppy = unit 0

The HP-IB switch is being used for more than just the HP-IB address of the device. It is being used to designate whether the flexible disc drive is unit 0 or unit 1. Note that the actual HP-IB addresses are still numbers from 0 through 7. Addresses 8 and 9 are the same as address 0; however in these positions, the 3 1/2-inch flexible disc drive is at Unit 0.

SELECTING THE HP-IB ADDRESS

To select an HP-IB address, locate the thumbwheel switch on the back of the unit. Use Figure 3-2 to locate the switch. Turn the thumbwheel switch until the address you want appears in the window. Refer to your system Operator's Manual for proper setting of the HP 9153A/54A address within the system.

VOLUME CONFIGURATION SWITCH

Volume selection is accomplished by SW1 switch bank located on the HP-IB interface module (see Figure 6-5). The switches allow the user to divide the Winchester disc into multiple volumes. These volumes are physical volumes which can be formatted independently with different interleaves and can have different file systems on them. To use this feature, the host must support multiple volumes. If the host supports only a single volume, volume 0, then this feature is of no use and should be set to the one volume setting. The settings on the volume switch have the following meanings:

Switch Setting 1234	Number of volumes	Capacity (Megabytes)
xxCC	1	10
xxC0	2	5
xx0C	4	2.5
xx00	8	1.25

KEY -
0 = OPEN
C = CLOSED
x = don't care

Figure 3-6. Volume Configuration Switch.

NOTE

To change the volume switches, first turn off the power, remove the two screws holding the Pesonality Module in place, remove the module, and select the kind of divisions you want. Now replace the Personality Module and turn the power back on. In order to write directories, reformat any volumes you are going to use. All old data will be lost when you format the volume. The switches also may be accessed directly when the top cover is removed during service.

[4] SELFTESTS DURING POWER-UP (HP 9153/54A S/N Prefix 2515A and Lower)

At power-on, a sequence of selftests check the PROCESSOR, ROM, HP-IB IC PROCESSOR RAM, BUFFER RAM, and the drive(s). The hard disc test reads and writes sectors,checks the spindle speed, and checks that the ECC IC functions correctly. The yellow (fault) LED, if it remains on after the power-on selftest, indicates if any problems were encountered in the selftests.

When the 9154A or 9153A is first powered-on, the red hard disc online LED and the yellow fault LED go on. The red hard disc online LED goes off and the flexible disc drive red LED comes on when testing of the flexible disc begins (9153A only). The YELLOW fault LED remain on until the power-on selftests are complete.

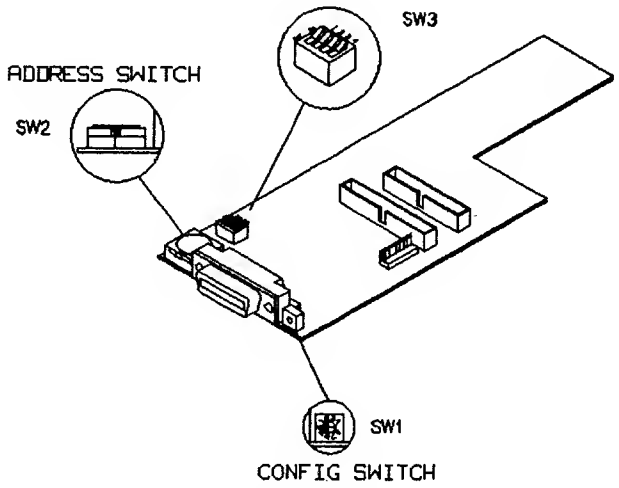
If the red disc-access lights go off and the yellow fault LED remains on continuously or is flashing, refer to Chapter 8, TROUBLESHOOTING AND DIAGNOSTICS, for a full explanation of these error codes and what and how to correct the fault.

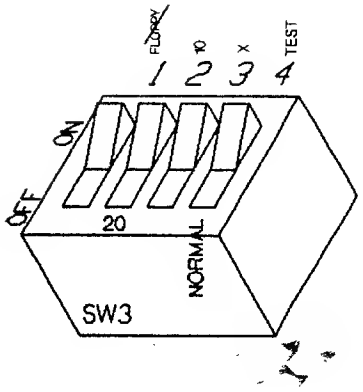
[5] CONFIGURATION OF STANDARD DRIVE UNIT

(HP 9153/54A units with S/N Prefix 2702A and Higher and the HP 9153/54B)

CONFIGURATION SWITCHES

Switch bank SW3, located on the Controller PCA near the HP-IB connector, is used to configure the unit and initiate the selftest routines. The following figures show the location of SW3 and the different configurations available.





SWITCH LABEL				HP 9153A and HP 9154A CONFIGURATION
FLOPPY	10	X	* TEST	
OFF	ON	OFF	OFF	10M BYTE HARD DISC WITH FLEXIBLE DISC
ON	ON	OFF	OFF	10M BYTE HARD DISC W/O FLEXIBLE DISC
ON	ON	ON	OFF	DONT CARE (UNUSED)

SWITCH LABEL				HP 9153B/HP 9154B CONFIGURATION
FLOPPY	10	X	* TEST	
OFF	OFF	OFF	OFF	20M BYTE HARD DISC PLUS FLEXIBLE DISC
ON	OFF	OFF	OFF	20M BYTE HARD DISC W/O FLEXIBLE DISC
OFF	ON	OFF	OFF	VIRTUAL 10M BYTE HARD DISC WITH FLEXIBLE DISC
ON	ON	OFF	OFF	VIRTUAL 10M BYTE HARD DISC W/O FLEXIBLE DISC
ON	ON	ON	OFF	DONT CARE (UNUSED)

* Used to initiate service selftest routines. Refer to Chapter 8 for further information.

Figure 3-7. Controller Configuration Switch SW3.

HP-IB ADDRESS SWITCH

The HP-IB address switch (see Figure 3-8) is a rotary switch with decimal numbers. This switch setting has the following meanings:

HP-IB switch = 0 through 7	HP-IB address of device is the same as the switch setting. Hard disc= unit 0 Floppy = unit 1
HP-IB switch = 8 or 9	HP-IB address of the device is 0. Hard disc = unit 1 Floppy = unit 0

The HP-IB switch is being used for more than just the HP-IB address of the device. It is being used to designate whether the flexible disc drive is Unit 0 or Unit 1. Note that the actual HP-IB addresses are still numbers from 0 through 7. Addresses 8 and 9 are the same as address 0; however in these positions the 3 1/2-inch flexible disc drive is at Unit 0.

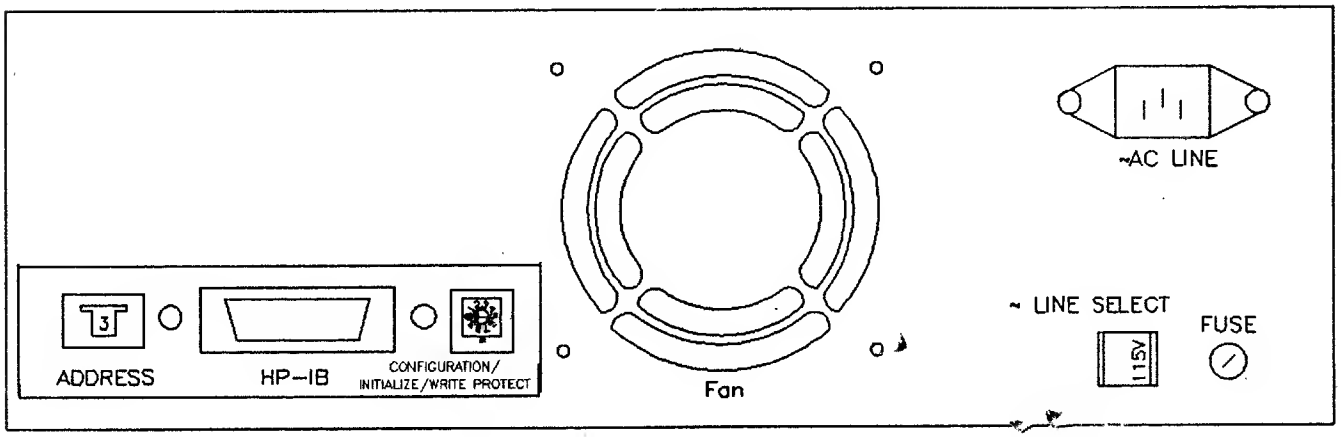


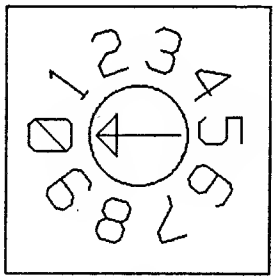
Figure 3-8. HP 9153/54A Rear Panel (S/N Prefix 2702A and Higher) and the HP 9153/54B

SELECTING THE HP-IB ADDRESS

To select an HP-IB address, locate the thumbwheel switch on the back of the unit (See Figure 3-8). Turn the thumbwheel switch until the address you want appears in the window. Refer to your system operator's manual for proper setting of the HP 9153B/54B address within the system.

VOLUME CONFIGURATION SWITCH

Volume selection is accomplished by switch SW1 located to the right of the HP-IB connector at the rear of the unit (see Figure 3-8). The switch allows the user to divide the Winchester disc into multiple volumes. These volumes can be formatted independently with different interleaves and can have different file systems on them. To use this feature, the host must support multiple volumes. If the host supports only a single volume, volume 0, then this feature is of no use and should be set to the one volume setting. The settings on the volume switch have the following meanings:



SW1

SETTING	NUMBER OF VOLUMES	VOLUME SIZES (Mbyte/VOL)
0	Allows re-initializing of existing volumes. At first, if you leave the switch at the factory setting of 0,the hard disc is initialized as one volume (it defults to 0).	
1	One	10.0
2	Two	5.0 | 5.0
3	Three	3.32 | 3.32 | 3.32
4	Four	2.49 | 2.49 | 2.49 | 2.49
5	Five	2.0 | 2.0 | 2.0 | 2.0 | 2.0
6	Six	1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66
7	Two	3.01 | 7.02
8	Prevents writing to the first volume of the hard disc. Prevents accidental re-initializing of the hard disc.	
9	Prevents accidental re-initializing of the hard disc.	

Volume Configuration Switch HP 9153/54A

SETTING	NUMBER OF VOLUMES	VOLUME SIZES (Mbyte/VOL)
0	Allows re-initializing of existing volumes. At first, if you leave the switc factory setting of 0, the hard disc is initialized as one volume (it defaults to	
1	One	20.12
2	Two	10.06 | 10.06
3	Three	3.01 | 3.01 | 14.1
4	Four	5.03 | 5.03 | 5.03 | 5.03
5	Two	5.03 | 15.09
6	Six	3.35 | 3.35 | 3.35 | 3.35 | 3.35 | 3.35
7	Two	3.01 | 17.11
8	Prevents writing to the first volume of the hard disc. Prevents accidental re-initializing of the hard disc.	
9	Prevents accidental re-initializing of the hard disc.	

Volume Configuration Switch HP 9153/54B

NOTE

To change the volume switches, first turn off the power, and select the kind of divisions you want. Then turn the power back on. In order to write directories, reformat any volumes you are going to use. All old data will be lost when you format the volume.

[6] SELFTESTS DURING POWER-UP

(HP 9153/54A units with S/N Prefix 2702A and Higher and the HP 9153/54B)

At power-on, a sequence of selftests checks the processor, ROM, HP-IB IC, processor RAM, buffer RAM, and the drive(s). The Winchester disc test reads and writes sectors, checks the spindle speed, and checks that the ECC logic functions correctly. The FAULT LED, if it remains on after the power-on selftest, indicates a problem was encountered in the selftests.

When the HP 9153A or HP 9154A is first powered-on, the FAULT and ON LINE LED will come on. The ON LINE LED goes off and the flexible disc drive ON LINE LED comes on when testing of the flexible disc begins (9153A only). The FAULT LED remains on until the power-on selftests are complete. All tests are performed in unit number order; i.e., if the address is 8 or 9, then the flexible disc drive is tested first.

If the flexible disc drive ON LINE LED goes off and the FAULT LED remains on continuously or is flashing, refer to Chapter 8, Troubleshooting and Diagnostics, for a full explanation of these error codes and what and how to correct the fault.

NOTE

If a new Winchester disc drive has just been installed, the FAULT LED will remain on until the drive has been formatted and the unit has been power cycled.

[7] USER INFORMATION AND OPERATION

WRITE PROTECT ERROR ON INITIALIZATION (HP 9153X)

A motor speed check is performed before initializing a flexible disc. If the motor speed is outside of the allowed tolerance, a Write Protect Error is generated preventing disc drive initialization. If the drive is operating properly, this indicates a defective flexible disc. Discard the disc.

DISC COMPATIBILITY (9153X)

The following table shows the recommended usage of single-sided and double-sided flexible discs with the HP 9153X. Words used in the table are defined as follows:

* "Exchange only" means that the disc should be used only for exchanging data and programs with single-sided disc drives, and should not be used on a daily basis.

* "OK" means that the disc may be used on a daily basis.

Single-sided HP disc	Exchange only
Double-sided HP media in single-sided format	OK
Double-sided HP media in double-sided format	OK
HP software	OK

SYSTEM SUPPORT

The following information shows the major host systems that support the HP 9153/54X drives.

HP 9000 Series 200, 300

Series 200

Boot ROM 3.0 or later
Basic 3.0 or later
Pascal 3.0 or later
HP-UX 2.0 or later

Series 300

Boot ROM Rev A or later
Basic 4.0 or later
Pascal 3.1 or later
HP-UX 5.0 or later

For more information on the 9000 system, refer to the Peripheral Installation Guide for HP 9000, Series 200/300 Computer (Part number 97005-90000).

HP Touchscreen II PC

Supported by the standard operating system.

HP 150 and HP Touchscreen PC

Upgrade Kit, part number 45849-63006, must be installed.

Instructions for using the HP 9153/54X with Series 200/300, HP Touchscreen II PC, and the HP Integral PC are provided in the " Getting Started with Your HP 9153/HP 9154 Disc Drive" operator manual (Part number 09153-90005).

PREVENTIVE MAINTENANCE

CHAPTER 4

[1] PREVENTIVE MAINTENANCE PROCEDURES

The Winchester disc drive in the HP 9153/54 A and B does not require preventive maintenance.

The flexible disc drive in the HP 9153A and B also does not require preventive maintenance. However, if excessive read errors appear, the head may be cleaned using a head cleaning kit available from HP (part number 09122-89415) which contains a head cleaning disc. Do not use the kit routinely because repetitive use of the cleaning disc may accelerate head wear.

The performance and life of the flexible disc drive and the flexible discs depend on how carefully they are handled. Refer to the disc care and handling guidelines presented in Chapter 1 of "Getting Started with Your HP 9153A/HP 9154A Disc Drive" (part number 09153-90000) for the proper care of the disc.

FUNCTIONAL DESCRIPTION

CHAPTER 5

Information in this chapter applies to the different product versions as follows:

Paragraph No.	Product Version
1 through 2	HP 9153/54A, S/N Prefix 2515A and lower
3	HP 9153/54A, S/N Prefix 2702A and higher HP 9153/54B, All Serial Numbers

[1] GENERAL OVERVIEW

The HP 9153 A and B are mass storage peripherals containing two disc drives: a 3 1/2-inch flexible disc drive and a 3 1/2-inch Winchester disc drive. The HP 9154 A and B contains only the 3 1/2-inch Winchester disc drive.

The flexible disc drive is double-sided, has a formatted capacity of 630 to 788 kbytes and has sector density of 256, 512 and 1024 bytes per sector. The Winchester is (10Mbyte for the HP 9153/54A, 20Mbyte for the HP 9153/54B) a 256 bytes per sector, single platter, dual-head drive designed by Hewlett-Packard.

A host computer is connnected to the HP 9153 or HP 9154 via the interface cable. The protocol used in communicating between the host and the HP 9153 or HP 9154 is the Subset 80 (SS/80).

The Controller receives SS/80 commands from the host via HP-IB, transfers data between the host and the discs, and reports execution status back to the host. Besides the tasks of reading and writing data to and from the discs, the Controller handles such things as error detection and correction, the formatting of discs at various interleaves, sparing of bad sectors, monitoring media wear, performing power-on tests and selected diagnostic tests.

[2] THEORY OF OPERATION

(HP 9153/54A units with S/N Prefix 2515A and Below)

Figure 12-1, Chapter 12, is a block diagram of the 9153-66502 Controller Board and 9153-66503 HP-IB Personality Board. The diagram can best be explained starting at the upper left hand corner. The CPU (Microprocessor) is the heart of the Controller Board. It is an 8-bit processor with the capability to do several 16-bit operations. The processor runs internally at 8Mhz with an external execution rate of 2MHz and handles all of the movement of data, bus arbitration, and acts as the master controller of all Controller Board operations.

The Controller Board has three data busses separated by bi-directional buffers: Microprocessor data bus, DMA data bus and the Adaptec data bus. The CPU can always access the ROM, SYSTEM RAM, FLOPPY DISK CONTROLLER (FDC), and I/O PORTS. However, during certain times, the CPU can be isolated from the DMA DATA BUS. The CPU monitors DMA transfers between the Winchester disc drive and the interface bus.

The MICROPROCESSOR DATA BUS has connected directly to it the ROM, SYSTEM RAM, I/O ports and the FLOPPY DISK CONTROLLER. The ROM consist of two 16K X 8 EPROMS and contains the software necessary for Controller operation as well as for the power-on test and selectable selftest routines. The SYSTEM RAM is 2K bytes of static memory and is used exclusively by the CPU for such things as pointers, tables and as scratch pad memory.

There are three input and three output ports (I/O). The input ports are used to monitor various disc and system signals, jumper settings and HP-IB addresses. The output ports are used to control disc drive operations and general system signals.

The FLOPPY DISK CONTROLLER (FDC) handles the interfacing to the flexible disc drive. The FDC block applies to the 9153A only. The FDC acts as the interface between the CPU and the flexible disc drive. Included in this block is CRC logic, write precompensation, an internal phase-lock loop, and data separator. When commands are given to this block from the CPU such as "read sector", it will then control the signals to locate the desired sector, lock onto the MFM data stream, transfer the data, and return a status upon completion.

The DMA data bus has connected to it the HP-IB, BUFFER RAM, DMA CONTROLLER and the HARD (Winchester) DISC CONTROLLER.

The HP-IB block shown represents the HP-IB Controller. Commands, data, and status information coming or going pass through this block. This block handles all HP-IB handshaking, parallel polling, primary and secondary addressing, and all other HP-IB protocol.

The BUFFER RAM is a 2k X 8 static RAM IC which is used only when data transfers involve either of the disc drives or the HP-IB. All sectors on the Winchester disc are 256 bytes long which allows four-sectors of data to be buffered at one time. The flexible disc sectors can be 256, 512, or 1024. The CPU can read and write data to the BUFFER RAM and is used for transferring data between the FDC and the BUFFER RAM. The other data transfers are handled by the DMA BUFFER CONTROLLER. The BUFFER RAM address lines are controlled by the BUFFER CONTROLLER.

The BUFFER CONTROLLER, when reading or writing to the Winchester disc drive, canconcurrently transfer data between BUFFER RAM and HDC, and between HP-IB and BUFFER RAM. For accesses to the flexible disc, the CPU handles transfers between FDC and BUFFER RAM. The BUFFER CONTROLLER handles transfers between the HP-IB and BUFFER RAM. These transfers are in series and cannot be done concurrently.

The HARD DISC CONTROLLER (HDC) BLOCK handles all interfacing between the BUFFER RAM and the Winchester disc drive. Should an error occur while the Winchester disc drive is transferring data, this block will flag the error and the error correction is done by the CPU using ERROR CORRECTION CONTROL (ECC) logic located within the HDC block. When the HARD DISK CONTROLLER (HDC) begins transferring data to or from the Winchester drive, the Controller must take over the DMA data bus and read/write control lines so that it can directly transfer data into or out of the BUFFER RAM. The BUFFER RAM is used to store data for the flexible disc drive, the Winchester disc drive and the HP-IB. The DMA DATA BUS is isolated from the MICROPROCESSOR DATA BUS whenever data is being transferred between the Winchester disc drive and BUFFER RAM or between the HP-IB and BUFFER RAM. Working in conjunction with the HDC is the Phase-Lock Loop (PLL) block. This block is responsible for locking onto and tracking the MFM data coming from the Winchester disc drive.

The third bus is the ADAPTEC DATA bus which allows the CPU access to the two ADAPTEC CONTROLLER blocks.

SAMPLE READ FROM THE FLEXIBLE DISC DRIVE

The sector read of the flexible disc procedes as follows:

The read command is sent from the host to the HP-IB. The CPU gets the read command with parameters from the HP-IB through the buffer. The CPU sends commands to FDC to seek to a desired cylinder and

then checks status. Assuming all is well, the CPU now configures the BUFFER CONTROLLER with the address of the first byte of data, then gives the FDC the command to read the sector. The CPU now waits for the first byte. When the flexible disc drive head is over the sector, the FDC reads and compares the header information. If the header information matches, it starts reading the data. After 8 bits are serially read, the CPU transfers the byte to buffer RAM, increments the RAM address and waits for the next 8 bits of data (one byte). After 256 bytes, the FDC signals the CPU that a complete sector has been read. The CPU now checks the FDC for any CRC error. Assume no CRC error. The data is now in BUFFER RAM. The CPU configures the HP-IB and the BUFFER CONTROLLER for a DMA transfer to the host. The CPU monitors the HP-IB and BUFFER CONTROLLER until the DMA transfer is complete. The CPU now transfers status through the HP-IB to the host indicating a completed command.

SAMPLE READ FROM THE WINCHESTER DISC DRIVE

The Winchester disc drive data transfers are controlled by the HDC. The HDC transfers data directly between buffer RAM and the Winchester disc drive under DMA control. The HDC is configured by the CPU.

A simplified explanation of a sector read on the Winchester disc drive is as follows:

The host sends a sector read command with parameters through the HP-IB to the CPU. The CPU controls the seek (through the I/O Port) of the Winchester disc drive to the desired cylinder. After the seek is complete, the CPU configures the BUFFER CONTROLLER and the HDC to read the sector. When the proper sector is found, serial data is transferred to the HDC. The HDC signals the BUFFER CONTROLLER and the bytes are written directly into BUFFER RAM. The CPU monitors the status after the sector read is complete. Assuming no errors, the bytes are now in BUFFER RAM. The CPU now configures the HP-IB and BUFFER CONTROLLER for data transfer to the host. The data is transferred under DMA control. When this is finished, the CPU completes the operation by reporting status to the host.

[3] THEORY OF OPERATION

(HP 9153/54A with S/N Prefix 2702A and higher and HP 9153/54B)

The controller is built around the Disc Controller IC. Interfacing to the Disc Controller are the: HP-IB controller, Buffer RAM, Microcomputer and I/O ports, PLL and the drive mechanisms. There are two address and data busses on this product. One set is dedicated to the Microcomputer and I/O ports while the other set is dedicated to the HP-IB interface and Buffer RAM. They are separated by the disc controller.

The Disc Controller provides the flexible disc, Winchester disc and DMA controller, interfacing to the HP-IB controller and address decoding and cycle stretching for the microprocessor.

There are five major blocks on this board: the HP-IB interface including the Buffer RAM, the Microcontroller, the input and output Ports, and the Phase Locked Loops. In the following discussion, please refer to the block diagram in Figure 5-4.

HP-IB INTERFACE

The HP-IB interface is made up of the Disc Controller Interface, the HP-IB Controller and HP-IB Tranceivers,and Buffer RAM sharing a common data bus.

The Disc Controller allows the Microcontroller to write commands directly to the the HP-IB Controller to set up its various control registers. IOA2-IOA0 provide the register addressing.

The Disc Controller uses the data bus; which is common between the Buffer RAM, Disc Controller and the HP-IB Controller; to provide DMA between the disc drive and RAM, the HP-IB Controller and RAM or Microcontroller and RAM. The Disc Controller provides the addressing for all of the DMA channels; therefore, the address bus is connected to the Disc Controller and Buffer RAM. The chip selects and timing signals are all provided by the Disc Controller.

CLOCKS AND RESETS

The system clock is generated by a 40MHz crystal which the disc controller divides into 8MHz for the microprocessor and 4MHz for the 3 1/2-inch Winchester mechanism.

Two reset lines have been implemented. The power supply provides a PVAL signal unasserted at power-on. During brown outs, the signal is re-asserted 100 milliseconds after the power supply output voltages become stable. This is the reset for the Disc Controller. The other reset is designed to follow PVAL when it goes low, but adds a few microseconds delay before re-asserting PVAL. This delayed reset goes to the rest of the controller board. The 100ms reset is provided to enable the oscillator to stabilize before using it to clock the Disc Controller. The following 20 microsecond delay is provided to enable the Disc Controller clock outputs to stabilize before using them to clock the rest of the controller PCA logic.

MICROCONTROLLER

The Microprocessor, 32Kx8 EPROM, 16Kx8 EPROM and 8Kx8 RAM form the Microcontroller hardware. The high order address lines A15-A12 and the E and Q clocks go to the Disc Controller which performs the address decoding and generates the chip selects and timing for the EPROM, RAM and I/O Ports. The addresses are decoded then ANDed with E+Q to prevent erroneous pulses. The low address lines A1-4 also go to the Disc Controller and are used to address its internal registers.

INPUT AND OUTPUT PORTS

Address decoding begins with the EXT_RD and EXT_WR pins from the Disc Controller . These lines are active when the processor is accessing between 2000 and 2FFF. They include the appropriate timing based on the E and Q clock. U21 decodes the these lines, with A10 and A11, and uses them as buffer enables and output latch clocks for Ports 0-2.

Two buffers provide the input ports for the HP-IB address switch, Volume Configuration switch, Drive Configuration switch and flexible disc drive status. Registers provide the output ports to the flexible disc drive, 3 1/2-inch Winchester control lines and the two front panel LED's. A Read or Write to Register 0 is an access to the 3 1/2-inch Winchester drive.

Following is a brief discussion of Read Ports 0 through 2. Read Port 0 is used by the 3 1/2-inch Winchester disc drives analog-to-digital converter and no further discussion will be given on this port. Figure 5-1 and the following text explains the meaning of data bits D0 through D7 for Read Ports 1 and 2.

READ PORTS (1 and 2) DATA BITS								
	D7	D6	D5	D4	D3	D2	D1	D0
RP1	VOLUME CONFIGURATION SWITCH				HP-IB ADDRESS SWITCH			
RP2	FLEX DISC DRIVE DISC CHANGE 3 1/2-inch Winch. FAULT	FLEX DISC DRIVE READY	FLEX DISC DRIVE TRACK 0	FLEX DISC DRIVE WRITE PROTECT	SELFTEST	DRIVE CONFIGURATION SWITCH SW3 (SEE FIGURE 5-2)		

Hex Address for Read Ports

Read Port 0 (RP0) 2080-20FF, 2180-21FF, 2280-22FF, 2380-23FF
Read Port 1 (RP1) 2400-247F
Read Port 2 (RP2) 2800-287F, 2900-297F, 2A00-2A7F, 2B00-2B7F

Figure 5-1. Read Port definitions.

RP1 (Read Port 1)

The HP-IB address switch is a thumbwheel with settings 0-9. The value on the switch is binary encoded into the above data lines. The number is represented in negative true logic, i.e., 6 is 1001.

The Volume Configuration Switch is a dial with settings 0-9. The values are also binary encoded and represented in positive true logic.

RP2 (Read Port 2)

Disc Change - This input from the flexible disc drive is low at power-on and whenever the disc is removed from the drive. The line remains true until a disc is installed and a STEP pulse or the DISK CHANGE RESET line is low.

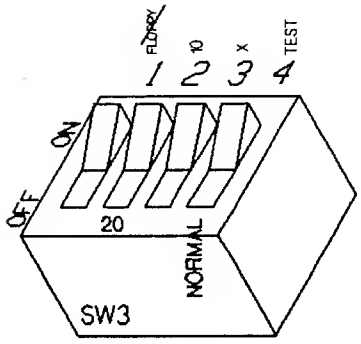
Ready- This input from the flexible disc drive is low when the drive is selected and a disk is inserted and the Index pulse period is stable within 100ms ± 2.5ms.

Track 0- This input from the flexible disc drive is low when the read/write head is positioned on track 0 or outside of track 0.

Write Protect - This input from the flexible disc drive is low when the write protect tab on the flexible disc indicates that the flexible disc is protected.

Selftest - Data bit 3 is a zero when the user has selected the board selftest mode by setting the rocker switch labeled TEST to the ON position.

The Drive Configuration switch bank is labeled SW3 on the controller PCA. If a switch is set to on, the bit is zero. The switch selects drive configurations based on the codes in Figures 5-2.



SWITCH LABEL				HP 9153A and HP 9154A CONFIGURATION
$\overline{\text{FLOPPY}}$	10	X	* TEST	
OFF	ON	OFF	OFF	10M BYTE HARD DISC WITH FLEXIBLE DISC
ON	ON	OFF	OFF	10M BYTE HARD DISC W/O FLEXIBLE DISC
ON	ON	ON	OFF	DONT CARE (UNUSED)

SWITCH LABEL				HP 9153B/HP 9154B CONFIGURATION
$\overline{\text{FLOPPY}}$	10	X	* TEST	
OFF	OFF	OFF	OFF	20M BYTE HARD DISC PLUS FLEXIBLE DISC
ON	OFF	OFF	OFF	20M BYTE HARD DISC W/O FLEXIBLE DISC
OFF	ON	OFF	OFF	VIRTUAL 10M BYTE HARD DISC WITH FLEXIBLE DISC
ON	ON	OFF	OFF	VIRTUAL 10M BYTE HARD DISC W/O FLEXIBLE DISC
ON	ON	ON	OFF	DONT CARE (UNUSED)

* Used to initiate service selftest routines.

Figure 5-2. Drive configuration switch definitions (HP 9153/54 A and B).

In the following discussion, we will discuss the Write Ports. Write Port 0 is used for the stepper motor on the 3 1/2-inch Winchester disc drive and no further discussion will be given on this port.

Figure 5-3 and the following text will explain the meaning of data bits D0 through D7 for Write Ports 1 and 2.

WRITE PORTS (1 and 2)
DATA BITS

	D7	D6	D5	D4	D3	D2	D1	D0
WP1	3 1/2-inch WINCH ACCESS LED	Not used	3 1/2-inch WINCH FAULT LED	3 1/2-inch WINCH DRIVE SELECT	FLEX DISC DRIVE SELECT 3	FLEX DISC DRIVE SELECT 2	FLEX DISC DRIVE SELECT 1	FLEX DISC DRIVE SELECT 0
WP2	Flexible disc drive Motor On	Flexible disc drive Head Select	Flexible disc drive Head Load	FLEX DISC DRIVE STEP	FLEX DISC DRIVE DIRECTION SELECT	FLEX DISC DRIVE CHANGE RESET	NOT USED	NOT USED

Hex address for Write Ports

```
Write Port 0 (WP0)  2080-20FF
Write Port 1 (WP1)  2400-247F, 2500-257F, 2600-267F, 2700-277F
Write Port 2 (WP2)  2800-2BFF
```

Figure 5-3. Write Port definitions.

WP1 (Write Port 1)

D7 Access LED - A zero on this bit illuminates the Access LED on the front panel of the flexible disc drive .

D5 Fault LED - A zero on this bit illuminates the FAULT LED.

D4 Drive Select NH - When this bit is a zero, it enables the Sector Signal from the 3 1/2-inch Winchester drive. This line must be enabled when using a 3 1/2-inch Winchester drive and disabled when using a flexible disc drive.

D3 Drive Select 3 - Floppy - When this bit is zero, the flexible disc drive is being accessed.

D0 Drive Select 0 - When this bit is a zero, it selects the 3 1/2-inch Winchester drive.

WP2 (Write Port 2)

D7 Motor On - When the drive is selected and a negative edge occurs on this line, the Motor On signal internal to the drive is set. Likewise, when the drive is selected and a positive edge occurs, the internal status is cleared. This internal Motor-on signal does not change when the drive is not selected. If the internal signal is set, whenever a flexible disc is installed the flexible disc drive spindle motor will turn.

D6 Head Select - This bit selects which side of the flexible disc is being accessed. A low signal on this line selects the upper (Head 1) side of the flexible disc.

D4 Step-Floppy - When this signal is a low pulse, the flexible disc drive head is stepped one track.

D3 Direction Select - When this bit is a zero and the drive is stepped, it will step toward the center track and vica versa.

D2 Disc Change Reset - When this bit is taken low and then back high while a flexible disc is installed, it clears the flexible disc drive Change Signal.

PHASE-LOCK-LOOP's AND DRIVE INTERFACE

The 3 1/2-inch Winchester and flexible disc drives are interfaced to the Disc Controller through two buffers and two PLLs. The Drive Signals: Sector, Fault, Index, 4 MHz clock, Write Gate, Write NIC (Controller IC on the Winchester drive) control signal, and Write Data interface directly to the Disc Controller chip through buffers. Read Data from the flexible disc drive is first received by a Schmitt Trigger Inverter. The Schmitt Trigger helps clean up the data line before it is interpreted by the PLL. The digital PLL recovers the Read Clock from the flexible disc drive Read Data line.

The Winchester disc data is also cleaned up by a Schmitt Trigger before being passed on to an Analog PLL. The PLL separates the clock and data from the Raw Read Data. The Disc Controller controls when the PLL should provide data by using the Read Gate signal, while the PLL indicates to the Disc Controller when it is synchronized with the disc data using the In-Sync line.

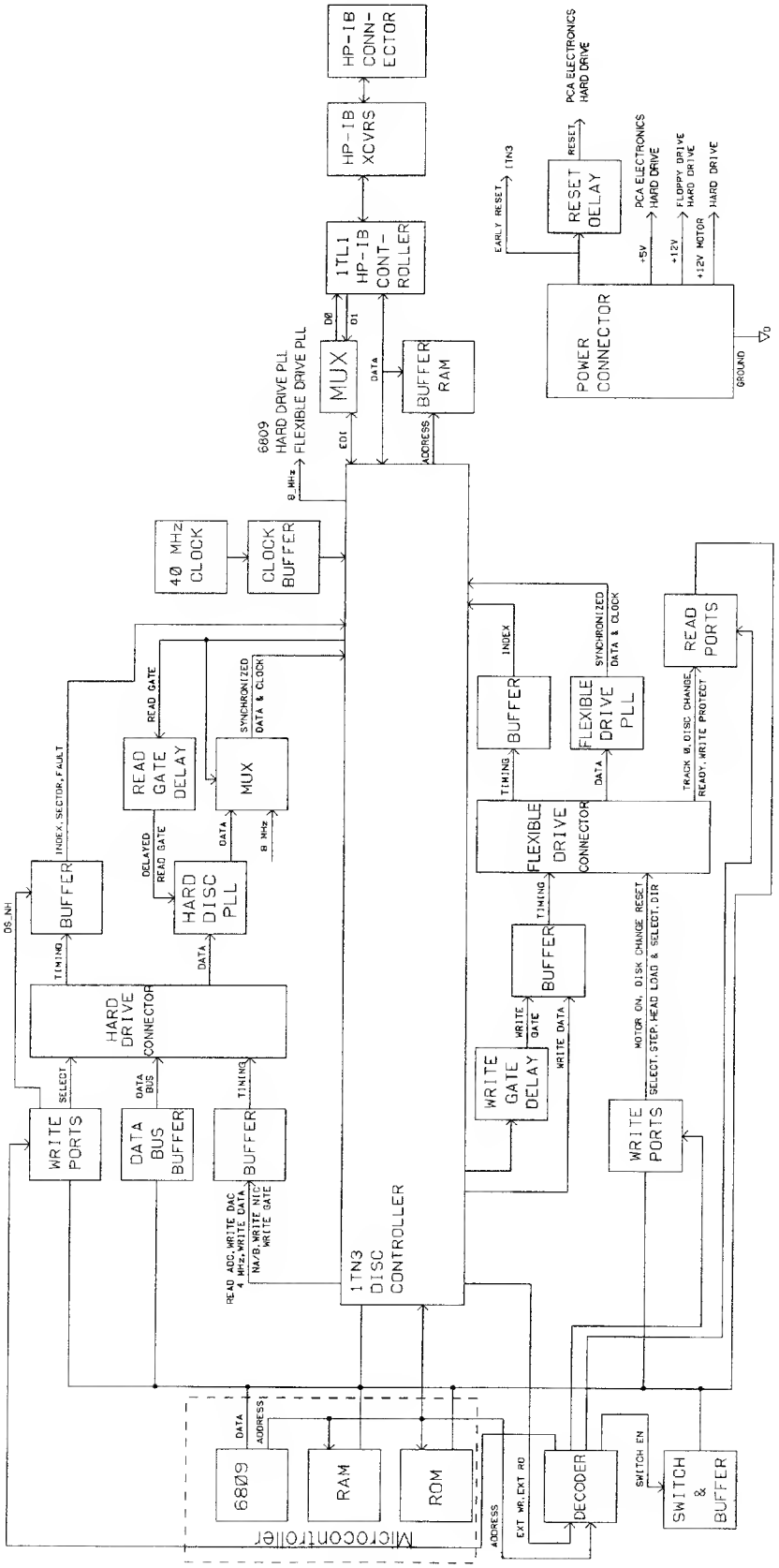


Figure 5-4. HP 9153/54B Block Diagram.

REMOVAL AND REPLACEMENT

CHAPTER 6

Information in this chapter applies to the different product versions as follows:

Paragraph No.	Product Version	Ref. Figure
1 through 6	HP 9153/54A, S/N Prefix 2515A and lower	9-1
7 through 10	HP 9153/54A, S/N Prefix 2702A and higher HP 9153/54B, All Serial Numbers	9-2

[1] INTRODUCTION (HP 9153/54A S/N Prefix 2515A and Below)

The following tools are required for disassembly and reassembly of the disc memory:

Torx driver T7
7mm Nutdriver (HP part number 8710-1217)
Needlenose pliers.
#1 Pozidriv screwdriver (HP part number 8710-0899)
#2 Poxidriv screwdriver (HP part number 8710-0900)

NOTE

Use figures 9-1 and 9-2 for assembly locations.
Use figures 6-3 and 6-4 for cable connector locations.

The assemblies labeled on Figure 12-2 and to the right of the headings for topics [2] through [6] are as follows:

(1) Top Cover
(A2) Power Supply PCA
(A3) Controller PCA
(3) Winchester Disc Drive (HP 9153A/54A)
(2) Flexible Disc Drive (HP 9153A only)
(A5) HP-IB Interface assembly

[2] TOP COVER REMOVAL (1)

To access the internal assemblies, the top cover must first be removed. Perform the following steps to remove the top cover.

- Remove the 2 screws located at the rear of the unit.
- Remove the 3 screws located on the bottom of the front panel.
- Slide the top cover forward for removal.
- To assemble, reverse the above process.

[3] CONTROLLER PCA REMOVAL (A3)

To remove the printed circuit assembly complete the following steps.

- Remove the DC power cable connecter (J3) from the front of the PCA.
- Remove the flat ribbon cables from the drive(s).
- If a 9153A, remove the flexible disc drive flat ribbon cable from in between the drives.
- Remove 2 torx screws visible throught the bracket cutouts.
- Remove the Controller PCA by sliding the PCA forward.
- To assemble, reverse the above process.

[4] POWER SUPPLY PCA REMOVAL (A2)

- Remove the fan connector J6 and main DC power connector J5.
- Pull the white AC power button from the switch shaft and remove the shaft after pulling it forward from the switch.
- Disconnect the the two connectors, J1 and J2, coming from the AC line filter.
- Remove the two cable connectors coming from the power transformer to the power supply PCA (J3 and J4).
- Remove the three mounting screws. Refer to Figure 6-3 for location (the fasteners with the "+" mark in them)
- Tilt the front of the PCA upwards enough to clear the transformer and lift the assembly from the chassis.
- To assemble, reverse the above process.

[5] DRIVE REMOVAL (2),(3)

There is an aluminum mounting plate to which the Winchester and/or flexible disc drive is attached. To remove the plate, perform the following steps:

- Remove the top cover as explained in [2].
- Remove all connectors from the drive(s).
- Remove the screw that secures the mounting plate to the main frame.
- Slide the mounting plate backward approximately 1/4 inch and lift upwards removing the drive mounting plate.
- To remove a drive, remove the screws that mount the drive to the drive mounting plate.
- To assemble, reverse the above process.

Once the Winchester drive mechanism has been removed from the drive mounting plate, the RFI shield may be removed as from the Winchester drive mechanism as follows:

- Remove the two screws located on the side of the drive mechanism.
- Straighten the two tabs at the bottom of the shield assembly.
- Pull the shield assembly from the drive mechanism.

When installing the shield assembly, locate the rear shield tab as shown in Figure 6-1 and verify that the Drive Select Switch located near the 40-pin connector set as in Figure 6-2.

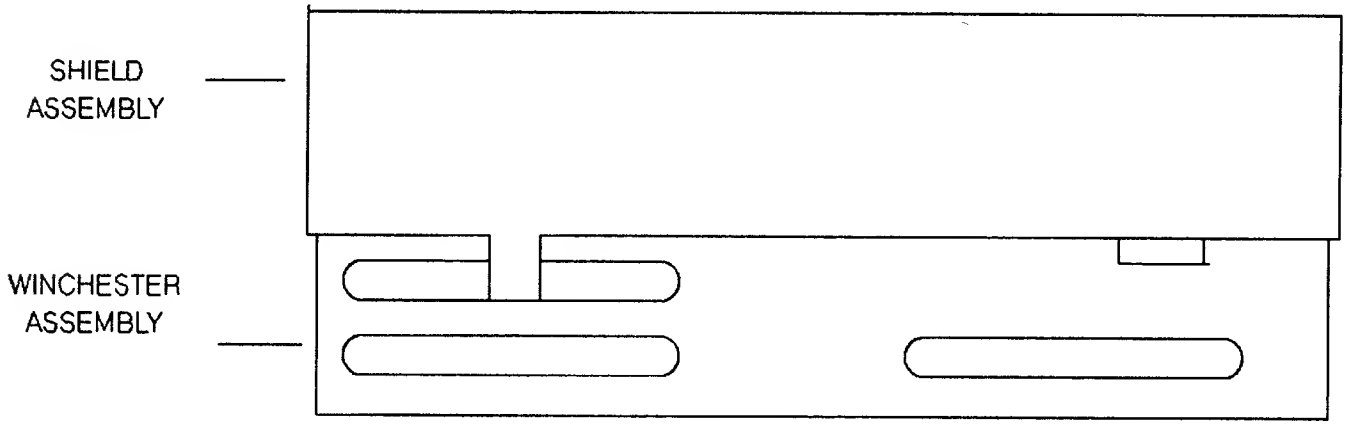
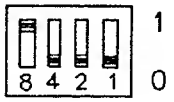


Figure 6-1. Rear View of 3 1/2-inch Winchester Mechanism.



Up for 9153A and 9154A

Switches 1,2,and 4 must be in the position shown for proper operotion in the 9153A/54A products.

Figure 6-2. Drive Select Switch.

[6] INTERFACE MODULE REMOVAL (A5)

- Remove the two screws securing the Interface Module to the chassis.
- Remove the module by pulling it out of the chassis.

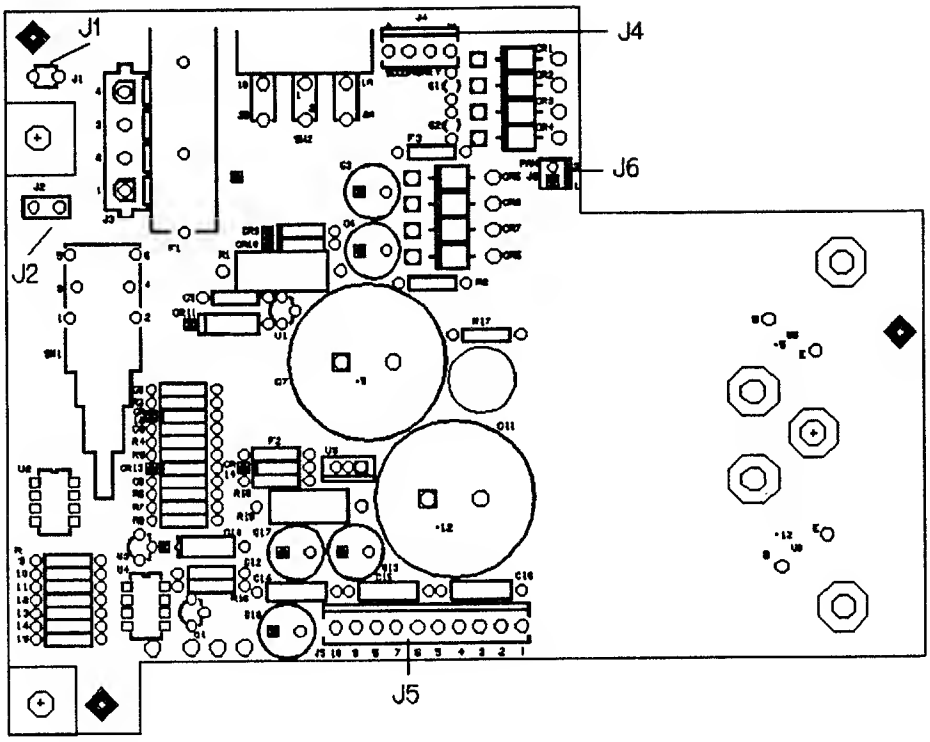


Figure 6-3. Power Supply PCA (A2).

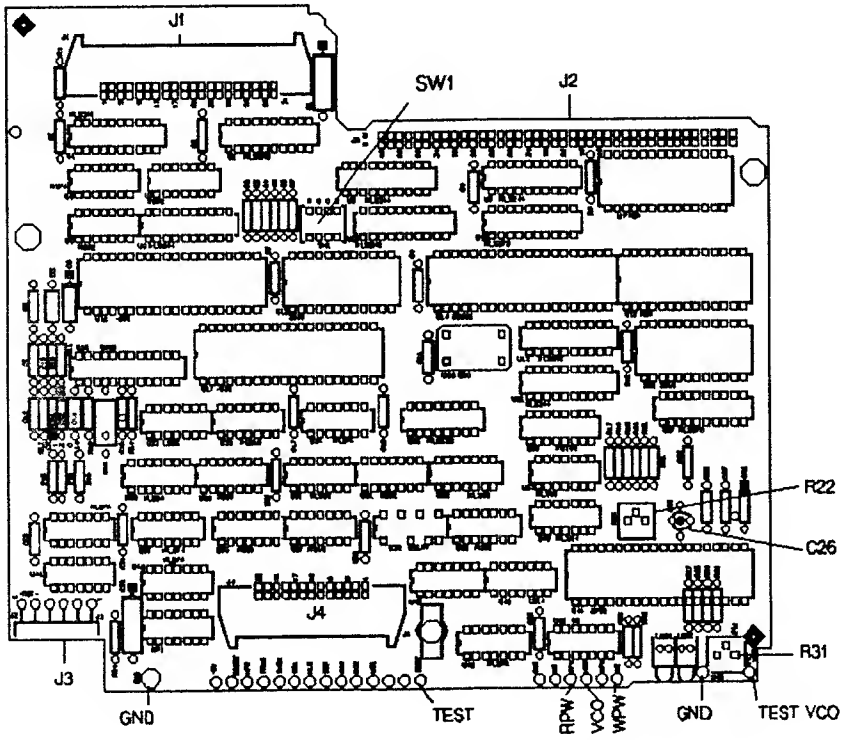


Figure 6-4. Controller PCA (A3).

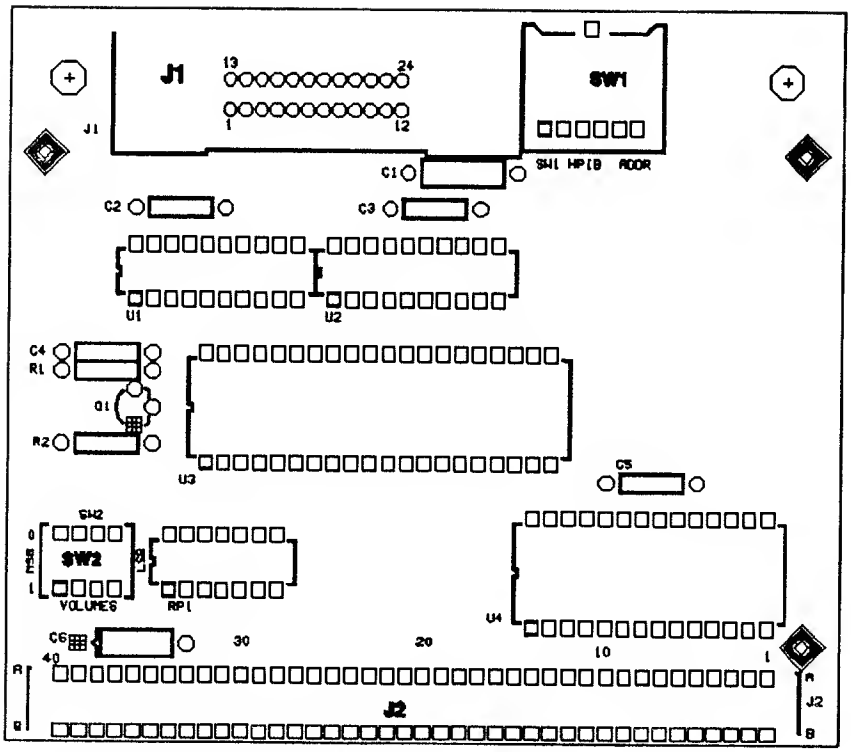


Figure 6-5. HP-IB Interface (Personality Module) PCA (A5).

The Following Sections, 7 thru 10, Pertain to HP 9153/54A's with a S/N prefix of 2702A and higher as well as the HP 9153/54B.

[7] TOP COVER REMOVAL

WARNING

Always disconnect the the disc drive from any AC line voltage before servicing.

To access the internal assemblies, remove the top cover:

1. Remove the two screws located at the rear of the unit.
2. Remove the three screws located on the bottom of the front panel.
3. Slide the top cover forward for removal.
4. To assemble, reverse the above process.

[8] CONTROLLER PCA REMOVAL

To remove the Printed Circuit Assembly (PCA), complete the following steps:

1. Disconnect the DC power, and the drive controller connectors from the controller PCA.
2. Remove the two Pozidrive screws that secure the HP-IB plate, and controller PCA, to the chassis.
3. Slide the controller PCA out the rear of the unit.
4. To assemble, complete the following steps:
   a. If the original controller is being reinstalled, reverse the above disassembly instructions.
   b. If a new controller PCA is being installed, perform the following steps:
      1) Loosen the HP-IB hex nuts holding the HP-IB plate to the controller PCA
      2) Slide the assembly (HP-IB plate and controller PCA) into the chassis
      3) Install the two Pozidrive screws securing the HP-IB plate to the chassis
      4) Tighten the HP-IB hex nuts using the 7mm hex nut driver.
      5) Reinstall all cables to PCA.

[9] POWER SUPPLY REMOVAL

1. Remove the DC power cable and fan cable located at the front of the supply. Remove the cables from the clamp on the shield.
2. Remove the snap-on plastic power supply shield as follows:
   a. Insert a flatblade screwdriver in the slot located in the top of the plastic shield and apply pressure (with the tip of the blade) towards the side of the chassis (THE SLOT IS USED AS A PRY POINT). This will release the single tab located on this side.

b. To release the remaining two tabs, pull outward on the side of the shield (closest to the drive) and lift upward. Remove the shield by sliding it out towards the front of the chassis.

3. Remove the three screws that mount the supply to the unit.

4. Lift power supply out of the unit.

5. Remove the two wires on terminals N and L located at the rear of supply.

6. To assemble, reverse the above process except for 2a and 2b. To re-install the shield, do the following:

Align the shields three tabs over the appropriate notches in the power supply

Push shield onto the the power supply.

[10] DRIVE REMOVAL

Refer to Figure 6-8 for the jumper configuration of the drives.

1. Removal of the 3 1/2-inch flexible disc drive from drive mounting assembly

a. Remove the screw located at the rear of the drive which secures the drive mounting plate to the drive mounting assembly.

b. Grasp the drive mounting plate near the screw hole which secures it to the drive mounting assembly, and lift the drive mounting plate up and away from the slot in drive mounting assembly.

c. Remove the three screws that secure the drive to the drive mounting plate.

d. To assemble, reverse the above process.

2. Removal of the 3 1/2-inch Winchester disc drive from the drive mounting assembly

a. Remove the screw located at the rear of the drive which secures the drive mounting plate to the drive mounting assembly.

b. Slide the drive mounting plate and drive towards the back of the drive mounting assembly and lift upwards removing the assembly.

c. Remove the three screws that secure the drive to the drive mounting plate.

d. To assemble, reverse the above process.

NOTE

Care should be taken to ensure proper fit of the flexible disc drive front bezel into the front panel opening (9153A only).

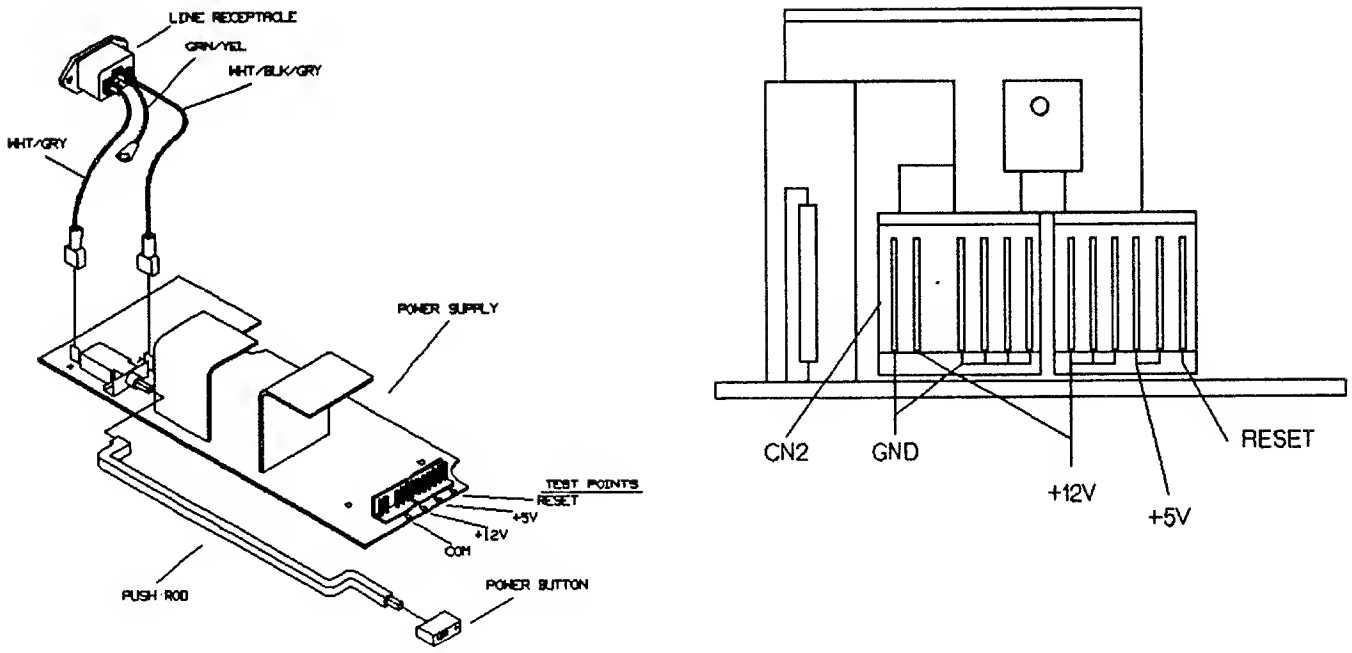


Figure 6-6. HP 9153A/HP 9154A power supply (S/N Prefix 2702A and above).

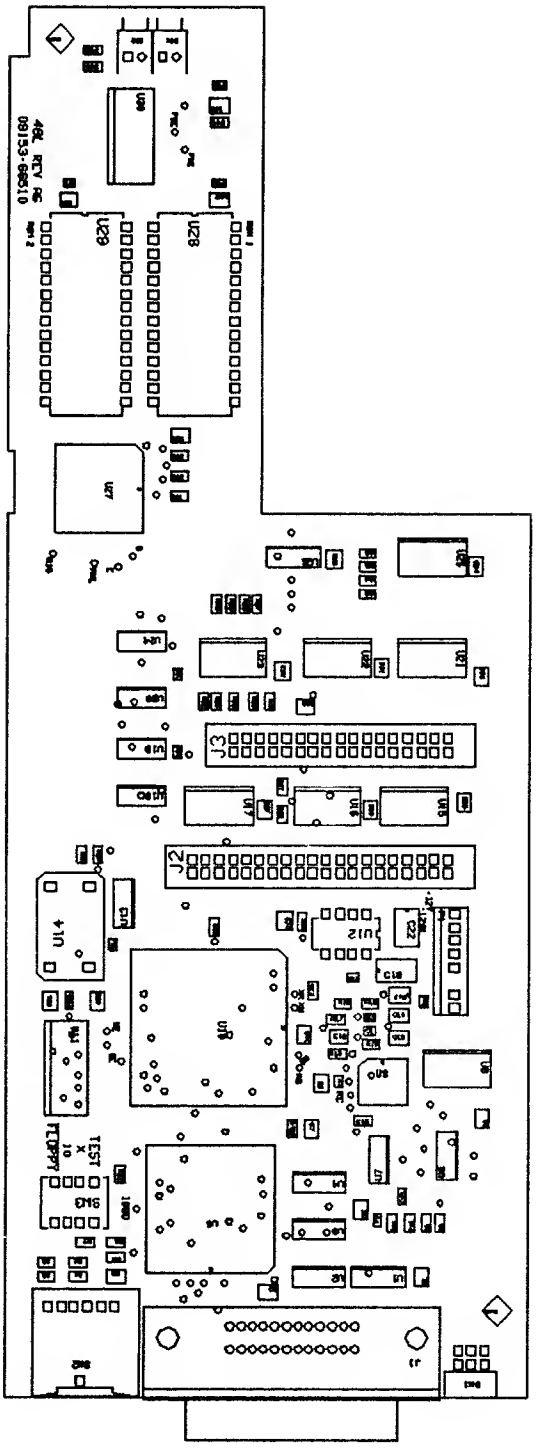


Figure 6-7. Controller PCA (S/N Prefix 2702A and above).

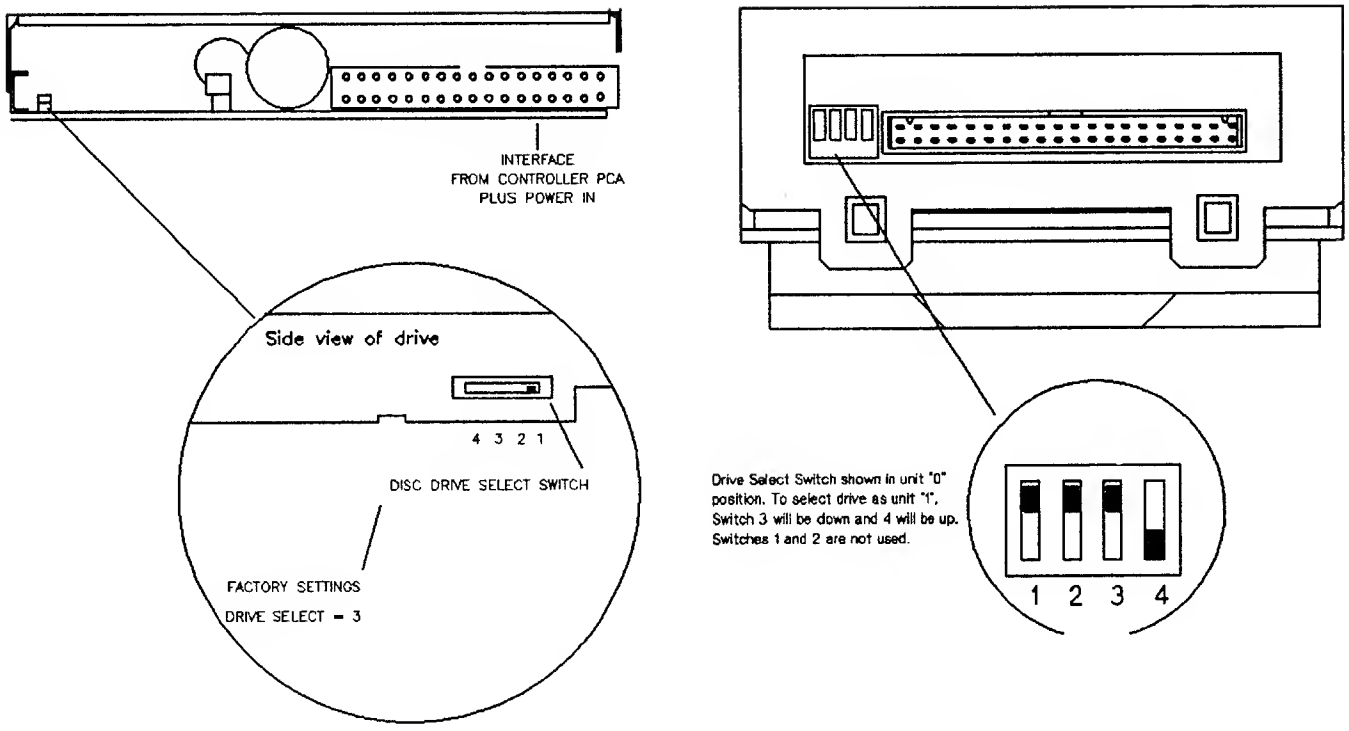


Figure 6-8. HP 9153A/HP 9154A drive configuration (S/N Prefix 2702A and above).

ADJUSTMENTS

CHAPTER 7

The information in this chapter pertains to the HP 9153A and HP 9154A with S/N prefix of 2515A and lower.

There are no adjustments required for any products with S/N prefix 2702A or higher or for the HP 9153B/54B.

[1] INTRODUCTION

There are no adjustments for the Winchester Disc Drive. The adjustments explained below refer to the 3 1/2-inch flexible disc drive in the 9153A (S/N prefix 2515A and below only). There are no adjustments on the HP 9153/54A S/N prefix 2702A and above as well as the HP 9153/54B. The Phase Lock Loop (PLL), Read Pulse Width (RPW), and Write Pulse Width (WPW) adjustments for the 3 1/2-inch flexible drive should be performed at an authorized Hewlett-Packard Repair Center and not in the field.

The following procedures and associated test points are provided to help isolate a failure to the 3 1/2-inch flexible disc drive or Controller PCA.

[2] PREPARATION FOR ADJUSTMENTS (HP 9153A S/N prefix 2515A and lower)

To gain access to the components for the adjustments, perform the following steps:

1. Remove the top cover as stated in Chapter 6, subsection [2].
2. Remove the DC power connector from the flexible disc drive.
3. Lift the flat ribbon cable from between the disc drives and disconnect it from the flexible disc drive.
4. Remove the screw that secures the drive mounting assembly to the mainframe.
5. Set the assembly down so that it rests on the side of the Winchester disc drive with the mounting plate next to the front of the chassis.
6. Reconnect the power and flat ribbon cable connector to the flexible disc drive.

All the adjustable components are accessible through cutouts in the controller mounting assembly.

[3] ADJUSTMENTS (HP 9153A S/N 2515A and below)

PHASE-LOCK LOOP ADJUSTMENT

The PLL, as well as the RPW and WPW adjustments require the FDC chip to warm up prior to adjustment. Perform the following procedures at an ambient temperature of 25° C (77° F) in the order specified.

Use Figure 7-1 for locating test points.

The PLL adjustment should be performed when the flexible disc drive exhibits read/verify errors or fails the "VERIFY" test (Test 7).

1. Power-on the unit, and allow the power-on selftest to finish.

2. Install a jumper between the TEST VCO test point and GND. This enables the FDC Adjust Mode.

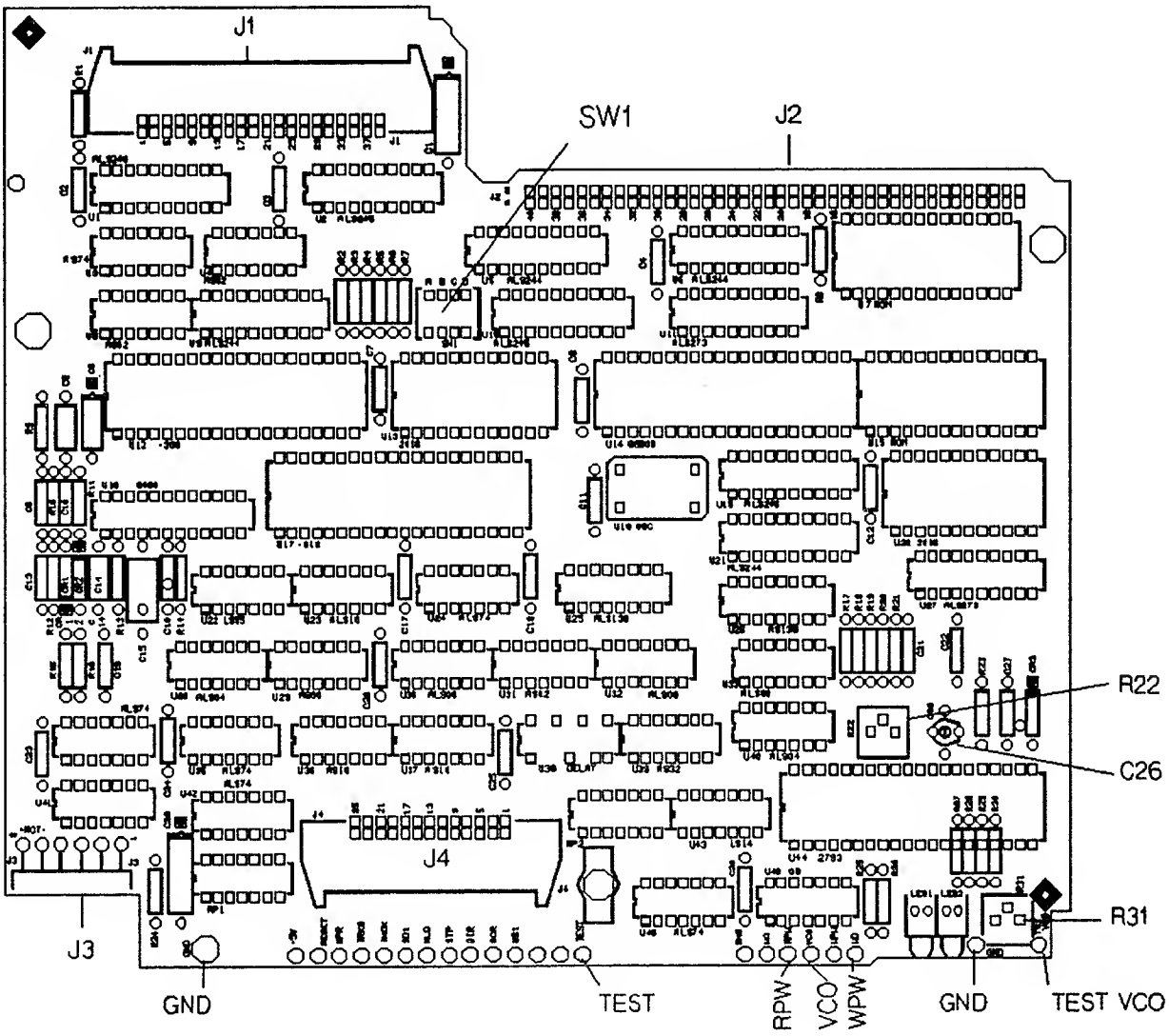


Figure 7-1. Controller PCA.

3. After a 2-minute warmup, attach the frequency counter test leads to the VCO testpoint. The frequency should be 500 KHz ±5%. If adjustment is necessary, adjust the variable capacitor C26 for a frequency of 500 KHz ±0.2% (+-1000 Hz).

4. Remove the jumper from the TEST VCO test point.

5. Recycle power and observe the selftest results.

READ PULSE WIDTH AND WRITE PULSE WIDTH ADJUSTMENTS

Use Figure 7-1 for locating test points.

1. Do the preceding power-on, and warm up steps (PLL ADJUSTMENT Steps 1 through 3).
2. Attach the oscilloscope test lead to the RPW test point.
3. Observe the waveform pulse width (see Figure 7-2). The pulse width should be 250 ns ±10%. If out of tolerance, adjust R31.
4. Attach the test lead to the WPW test point and observe the pulse width. The width should be 125 ns ±10%. If out of tolerance, adjust R22.
5. Remove the jumper from the TEST VCO test point.
6. Verify disc operation as in step 5 of the PLL Adjustment.

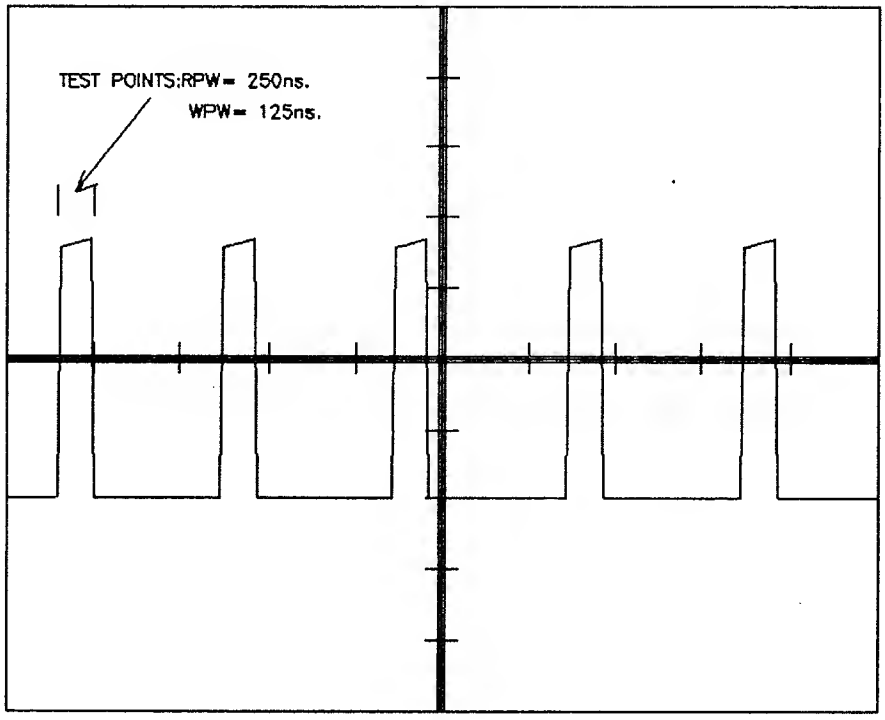


Figure 7-2. Read/Write Pulse Width.

TROUBLESHOOTING AND DIAGNOSTICS

CHAPTER 8

Information in this chapter applies to the different product versions as follows:

Paragraph No.	Product Version
1 through 4	HP 9153/54A, S/N Prefix 2515A and lower
5 through 10	HP 9153/54A, S/N Prefix 2702A and higher HP 9153/54B, All Serial Numbers

[1] REPAIR PHILOSOPHY (HP 9153/54A S/N Prefix 2515A and Below)

The 3 1/2-inch disc drive assemblies and the controller PCA are on the exchange program. The part numbers for for the Field Replaceable Units (FRU's) are as follows:

3 1/2-inch Flexible Disc Drive	-- 09114-69511
Controller PCA (9153A)	-- 09153-69502
3 1/2-inch Winchester	-- 09153-69121
Fan	-- 09125-68500
Power Supply	-- 09153-67501

[2] PREPARATION FOR TROUBLESHOOTING (HP 9153/54A S/N Prefix 2515A and Below)

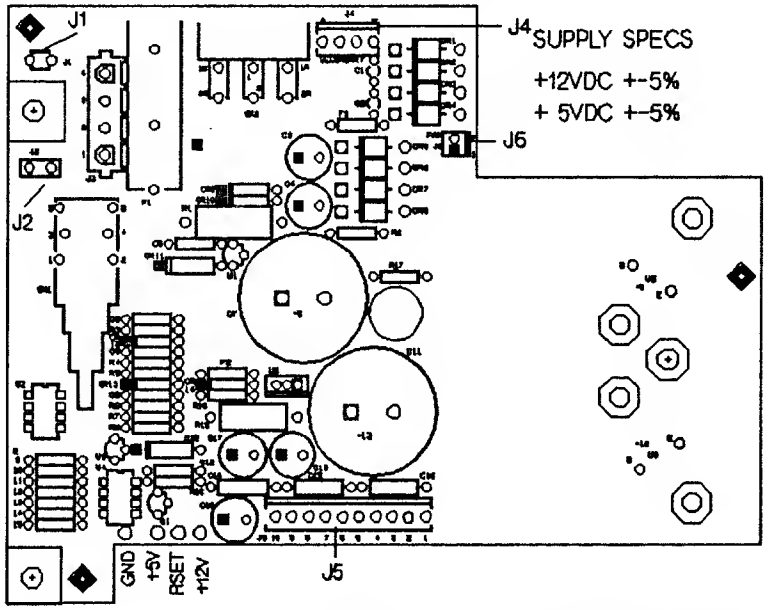
The following procedure arranges the Drive Control PCA for easy access to test points and jumpers for troubleshooting.

1. Remove the top cover as described in Chapter 6, subsection [2].

2. All switches are accessible through cutouts in the controller PCA mounting assembly.

[3] POWER SUPPLY ASSEMBLY (HP 9153/54A S/N Prefix 2515A and Below)

Power supply voltages should be checked before any troubleshooting procedures are started. The following figure shows the location of power supply voltage test points. This will aid you in isolating the failure to a replaceable assembly. The power supply is not an exchange assembly.



J5 Connector Assignments

PIN #	FUNCTION
1	+12VDC To Flexible Disc Drive
2	GND "
3	GND "
4	+5VDC "
5	RESET
6	+5VDC To Controller PCA
7	+12VDC "
8	GND "
9	GND To Winchester Disc Drive
10	+12VDC To Winchester Disc Drive motor

Figure 8-1. Power Supply PCA (09153-67501).

[4] SELFTESTS (HP 9153/54A S/N Prefix 2515A and Below)

Refer to Figure 8-2 for location of LEDs metioned in the following text.

Selftest routines can be initiated in 3 different ways:

1. At power-on, a selftest of the PROCESSOR, ROM, HP-IB chip, RAM, BUFFER RAM and both drives are performed. The Winchester disc drive test includes reading and writing sectors, checking the spindle speed, and checking that the error correction circuitry functions correctly by introducing errors and correcting them. The yellow fault LED stays on if the power on selftest fails.

2. An "Initiate Diagnostic" may be given from the host computer. Tests normally run at power-on are done.

3. If no host computer is available, a service test point can be grounded causing the 9153A/54A to go into the diagnostic test mode. It reads the HP-IB switch to determine which test should be performed. The yellow (fault) selftest LED first blinks (to show that the LED works) and then the test selected by the switch settings is performed. A successful test is indicated by the LED blinking 5 times. A failure causes the LED to stay on for 5 seconds. If the test point remains grounded the test is repeated. When the ground is removed from the service test point, the 9153A or 9154A will go through the power-up sequence and will again be in the peripheral mode of operation, waiting for commands over the HP-IB.

The results of a successful test are displayed by the yellow fault LED blinking five times (once per second) followed by a complete power-up sequence. A failure causes the yellow fault LED to stay on.

The following discussion will cover items 1 and 3 above.

TEST PERFORMED DURING POWER-ON

At power-on, a sequence of tests checks the PROCESSOR, ROM, HP-IB chip, PROCESSOR RAM, BUFFER RAM, and the drive(s). The Winchester disc drive test reads and writes sectors,checks the spindle speed, and checks that the error correction circuitry is functioning.

When the 9153A or 9154A is first powered on, the red Winchester disc drive on-line LED and the yellow fault LED come on. The yellow fault LED will come on as each of the tests in the power-on sequence is executed and remain on until each test is finished. In the case of a 9153A, the red Winchester disc drive on-line LED goes off and the red flexible disc drive LED comes on when the flexible disc part of the testing begins.

A failure of a test in the power-on sequence is signalled by the yellow fault LED blinking with specific patterns as explained below.

If the yellow fault LED remains on continuously after the red Winchester disc drive on-line LED and the flexible disc drive access LED have gone off, something has failed that prevents the yellow fault LED from communicating the failure through its flashing codes (for example, processor or RAM failure). Individual tests should then be run to attempt to isolate the problem. Refer to the next subsection, MANUAL EXECUTION OF SELECTABLE SELFTESTS.

If the disc drive powers up and shows a flashing fault LED failure indication, this indication will remain on until you successfully do an Initiate Diagnostic command, an Initialize media command, or again power up

the drive and the drive passes. If either the flexible or Winchester disc drive fails the power-on test, but the other is fully functional (9153A), the good drive may be used. No drive may be used if the yellow fault LED is on continuously.

FAULT LED INDICATIONS DURING POWER-ON

The yellow fault LED will give an indication of what has failed during the power-up test as follows:

1. Both LEDs (fault LED and Winchester access LED) stay off. The microprocessor has failed. Replace the Controller PCA.

2. Both LEDs stay on. The microprocessor failed power-on test or the main CPU RAM failed. Replace the Controller PCA.

3. FAULT LED on 6 seconds, blinks off 7 times, repeats. HP-IB Personality interface module failed. Replace the Interface

4. FAULT LED on 6 seconds, blinks off 6 times, repeats. The HP-IB Interface Module failed. Replace the Interface module.

5. FAULT LED on 6 seconds, blinks off 2 times, repeats. Processor RAM is bad. Replace the Controller PCA.

6. FAULT LED on 6 seconds, blinks off 1 time, repeats. Rom checksum is wrong. Replace the Controller PCA.

7. FAULT LED on 6 seconds, blinks off 3 times, repeats. The buffer RAM is bad. Replace the Controller PCA.

8. FAULT LED on 6 seconds, blinks off 4 times, repeats. The configuration switches are set to an illegal configuration. Check the settings with Figure 3-5 in Chapter 3. The switches are located near the center of the board.

9. FAULT LED on 6 seconds, blinks off 5 times, repeats. The HP-IB chip is bad. Replace the Interface Module.

If all of the tests passed, then the FAULT LED goes out and the 9153A/9154A is ready for use.

MANUAL EXECUTION OF SELECTABLE SELFTESTS

There are 8 selectable selftests available. The list of tests follows after this explanation of procedure and the example of running the RAM test.

To run the tests, the HP-IB address switch should be set to the desired test number and the "TEST" test point, located to the right of the flexible disc cable connector (J4), must be shorted to ground (GND).

NOTE

Because the RAM test clears all parameters, some of which are needed for other tests, do not switch arbitrarily from test to test. The RAM test should be performed first or be the last test which is run. After each RAM test the unit goes through its power-on sequence.

The following is an example of running the RAM test as the first test performed.

1. Turn off the power to the unit.

2. Select the RAM test (0 on the HP-IB address switch) and jumper the "TEST" test point to ground (GND).

3. Turn on power. The unit then begins executing the RAM test. The yellow fault LED remains on during the test. When the test is completed, the yellow fault LED should blink 5 times. If the yellow fault LED remains on continously, the test failed.

4. Turn power off. Select the next test using the HP-IB address switch. Do NOT select the RAM test (0 or 8).

5. Turn on power. The unit will begin the specified test. Again, when the test completes, the yellow fault LED should blink 5 times. If it doesn't, the test failed. The unit automatically repeats the test until another test selection is made or the unit is turned off.

More tests may be selected, as needed (except the RAM test) without turning the power off. There is a delay after the selection of a test until execution of the test is begun.

FAULT LED INDICATIONS DURING MANUAL EXECUTION OF SELFTESTS

The yellow fault LED will go on for one second (To show that it works) at the beginning of each test. The LED will then go on, and stay on, during the length of the test. A pass indication is displayed by the yellow fault LED blinking 5 times. A failure is displayed by the yellow fault LED remaining on.

INDIVIDUAL SELFTESTS AVAILABLE

TEST #		TEST TIME	TEST DESCRIPTION
0 or 8	RAM	2s	All possible patterns are written in all locations of the microprocessor RAM (located near the ROM).
1 or 9	ROM	3s	A checksum calculation is performed.
2	INTERFACE	3s	Two of the registers on the HP-IB IC (located on the HP-IB Personality Module) are written to and their contents are verified.
3	FDC IC	3s	Two of the registers on the FDC IC are written to and their contents are verified.
4	Data buffer RAM test	3s	Test the data buffer RAM.
* 5	Power-on selftest for Unit #0		The power-on selftest is performed on Unit #0 exclusively.
* 6	Power-on selftest for Unit #1		The power-on selftest is performed on Unit #1 exclusively. (If this position is selected on a 9154A, it will be ignored.)
7	Floppy Verify	40s	All sectors in the data area of the disc are checked for CRC errors. No user data is affected. (If this position is selected on a 9154A, it will be ignored.) A disc must be in the drive to perform Test 7. Use an initilized non write protected scratch disc. This is to ensure that no customer data will be lost.

* The HP-IB address determines which drive will be unit 0 or unit 1 when the 9153A/54A is turned on.

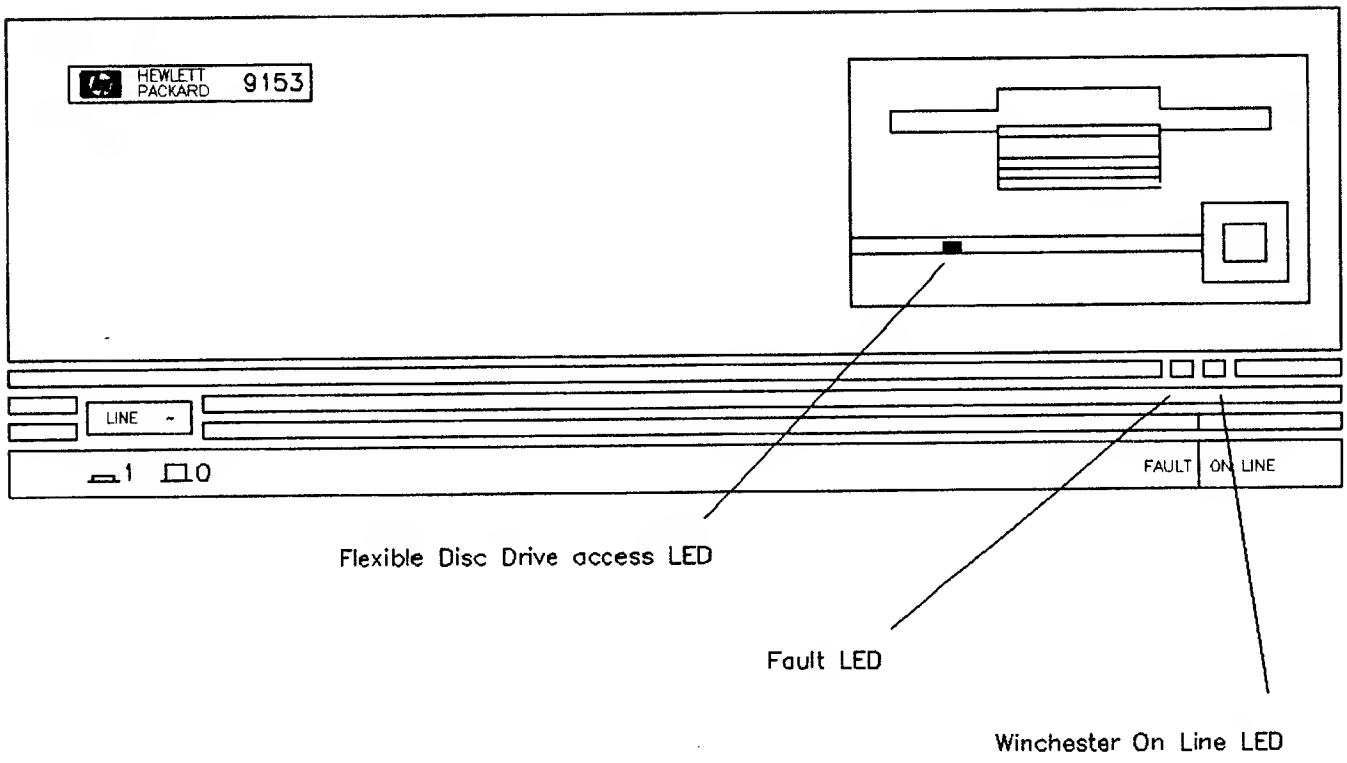


Figure 8-2. Front panel Control Indicators.

The following sections, 5 thru 10, pertain to S/N prefix 2702A and higher and the HP 9153/54B

[5] REPAIR PHILOSOPHY

(HP 9153/54A S/N Prefix 2702A and Higher as well as HP 9153/54B)

The HP 9153/9154A are serviced by replacing major assemblies. Repair at a lower level than major assemblies is not supported.

The part numbers for for the major replaceable assemblies are as follows:

3 1/2-inch Flexible Disc Drive	-- 09123-69101
Controller PCA	-- 09153-69530
3 1/2-inch Winchester	-- 45816-69111
Fan	-- 09144-68501
Power Supply	-- 09153-67110
AC Line Filter	-- 09153-68802

Defective assemblies are identified by observing a system in operation, using the power-on selftest and service tests in the firmware, and by use of the SS/80 Exerciser.

[6] PREPARATION FOR TROUBLESHOOTING

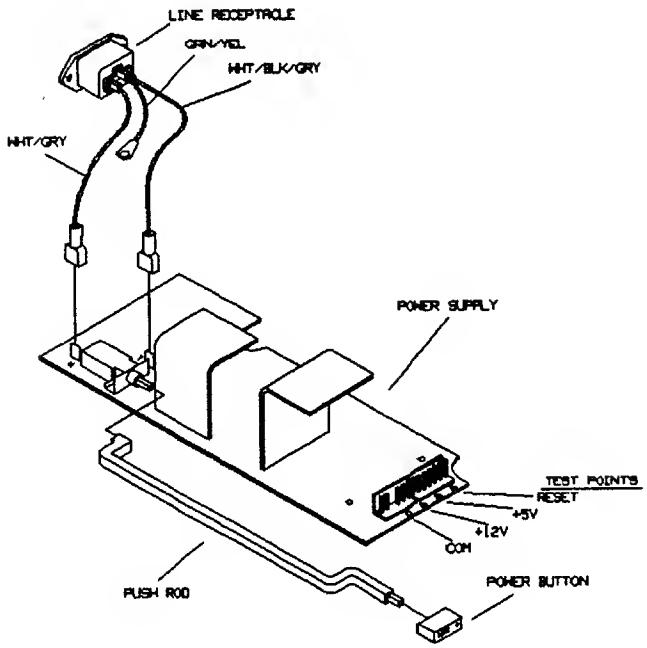
(HP 9153/54A S/N Prefix 2702A and Higher as well as HP 9153/54B)

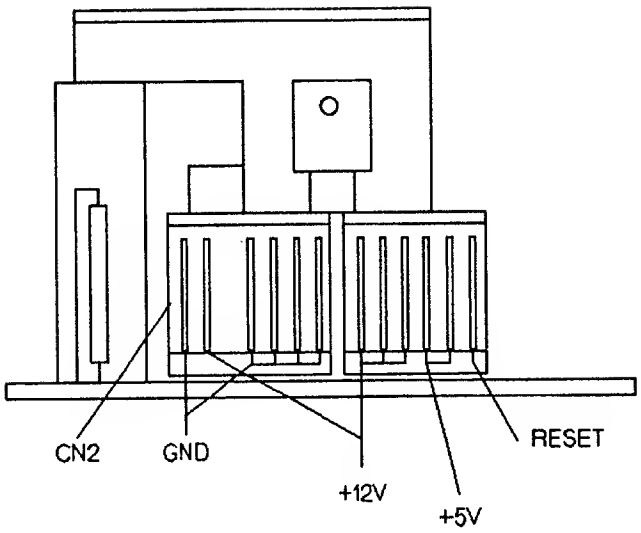
Remove the top cover as described in Chapter 6, Section 2, to provide access to the switches used in troubleshooting.

[7] POWER SUPPLY ASSEMBLY

(HP 9153/54A S/N Prefix 2702A and Higher as well as HP 9153/54B)

Power supply voltages should be checked before any troubleshooting procedures are started. The following figure shows the location of power supply voltage test points. This will aid you in isolating the failure to a replaceable assembly. The power supply is not an exchange assembly.





POWER SUPPLY SPECIFICATIONS

+5 Vdc	4.75 - 5.25 Vdc
+12 Vdc	11.4 - 12.6 Vdc

Figure 8-3. Power Supply PCA.

[8] SELFTESTS

(HP 9153/54A S/N Prefix 2702A and Higher as well as HP 9153/54B)

Refer to Figure 8-2 for location of LEDs mentioned in the following text.

Selftest routines can be initiated in 3 different ways:

1. At power-on, a selftest of the Processor, ROM, HP-IB chip, RAM, Buffer RAM and both drives are performed. The Winchester disc drive test includes reading and writing sectors, checking the spindle speed, and checking that the error correction circuitry functions correctly by introducing errors and correcting them. The FAULT LED stays on if the power on selftest fails.

2. An "Initiate Diagnostic" may be given from the host computer. Tests normally run at power-on are done. (This is currently available only with the HP85 Service System.)

3. If the HP85 Service System is not available, setting the "TEST" switch of SW3 on the controller PCA to the TEST position, will put the unit into the Service Selftest mode. The results of a successful test are displayed by the FAULT LED blinking five times (once per second) followed by a complete power-on sequence. A failure causes the FAULT LED to stay on.

The following discussion will cover items 1 and 3 above.

TEST PERFORMED DURING POWER-ON

At power-on, a sequence of tests checks the Processor, ROM, HP-IB chip, Processor RAM, Buffer RAM, and the drive(s). The Winchester disc drive test reads and writes sectors, checks the spindle speed, and checks that the error correction circuitry is functioning.

When the HP 9153A/B or HP 9154A/B is first powered on, the ONLINE LED and the FAULT LED come on. The FAULT LED will come on as each of the tests in the power-on sequence is executed and remain on until each test is finished. In the case of a 9153A/B, the ONLINE LED goes off and the flexible disc drive ACCESS LED comes on when the flexible disc part of the testing begins (This assumes that the Winchester is unit "0".)

A failure of a test in the power-on sequence is displayed by the FAULT LED blinking with specific patterns as explained below.

If the FAULT LED remains on continuously after the ONLINE LED and the flexible disc drive ACCESS LED have gone off, something has failed or Winchester disc drive is not initialized.

LED INDICATIONS DURING POWER-ON

The FAULT LED will give an indication of what has failed during the power-up test as follows:

1. Both LEDs (FAULT LED and ONLINE LED) stay off. The microprocessor has failed.
2. Both LEDs stay on. The microprocessor failed power-on test or the main CPU RAM failed.
3. FAULT LED on 6 seconds, blinks off 1 time, repeats. Rom checksum is wrong.
4. FAULT LED on 6 seconds, blinks off 2 times, repeats. Processor RAM is bad.
5. FAULT LED on 6 seconds, blinks off 3 times, repeats. The buffer RAM is bad.
6. FAULT LED on 6 seconds, blinks off 4 times, repeats. The configuration switches are set to an illegal configuration.
7. FAULT LED on 6 seconds, blinks off 5 times, repeats. The HP-IB chip is bad.
8. FAULT LED on 6 seconds, blinks off 6 times, repeats. microprocessor has failed.
9. FAULT LED on 7 seconds, blinks off 7 times, repeats. The Disc Controller chip is bad.
10. The drives are then tested in `unit number order`. Testing continues even if a failure occurs.

Following is a list of the items checked on each drive:

Winchester Disc Drive

- Check wether drive is connected.
- Initialize the seek table.
- Recal to 0.
- If the drive is initialized then
  - build the seek table
  - perform a write/read compare test on the system (no user data affected)
  - perform an ECC test.

Flexible disc drive

- A seek test is done.
- If media is in the drive, then the index period is checked.
- If the disc in the drive is single sided format, then testing is complete.
- On double sided discs, if the disc is write protected, only a Read test is performed. If the disc is not write protected, a write, read, and compare test is performed (all writing is done in non-data areas, no customer data is at risk).

If all the tests pass, the FAULT LED goes out and the HP 9153/54 A & B is ready for use.

EXECUTION OF SERVICE SELFTESTS

There are eight selectable service selftests available. The list of tests follows this explanation of procedure and the example of running the RAM test.

The Service Selftests are enabled as follows:

1. Remove power from the unit to be tested.
2. Select the test to be executed with the HP-IB address switch. (See P.8-8 for a description of the test.)
3. Set the "TEST" section of SW3 to ON (See Figure 8-8)
4. Apply power to the unit.
5. The following sequence of events should occur:

    a. The unit will go through a complete power up sequence. The ONLINE and flexible disc drive ACCESS LED will be off at the conclusion of the power-on sequence.

    b. The FAULT LED remains on for approximately 4 seconds, blinks off, then comes on again as execution of the selected test begins.

    c. If the selected test is successful, the FAULT LED will blink off five times, remain on for approximately four seconds, then repeat the test. Additional tests may be selected by moving the HP-IB switch to the desired test if the current test is not the RAM test (Test 0). See procedure for RAM test below.

    d. If the test fails, the FAULT LED remains on at the completion of the test, no further testing occurs, and no other Service Selftest can be selected without power cycling the unit.

NOTE

Because the RAM test clears all parameters, some of which are needed for other tests, do not switch arbitrarily from test to test. The RAM test should be performed first or be the last test which is run. After each RAM test the unit must go through its power-on sequence.

The following is an example of running the RAM test as the first test performed.

1. Turn off the power to the unit.

2. Select the RAM test (0 on the HP-IB address switch) and set the "TEST" switch of SW3 to the TEST position.

3. Turn on power. The unit will go through a complete power-on sequence, then begins executing the RAM test. The FAULT LED remains on during the test. When the test is completed, the FAULT LED should blink 5 times. If the FAULT LED remains on continuously, the test failed.

4. Turn power off. Select the next test using the HP-IB address switch. Do NOT select the RAM test.

More tests may be selected as needed (except the RAM test) without turning the power off. There is a delay after the selection of a test until execution of the test is begun.

FAULT LED INDICATIONS DURING EXECUTION OF SERVICE SELFTESTS

The FAULT LED will go on for one second (To show that it works) at the beginning of each test. The LED will then go on, and stay on, during the length of the test. A pass indication is displayed by the FAULT LED blinking 5 times. A failure is displayed by the FAULT LED remaining on.

SERVICE SELFTESTS AVAILABLE

TEST #		TEST TIME Min Sec	TEST DESCRIPTION
0	RAM	: 2	All possible patterns are written in all locations of the microprocessor RAM
1	ROM	: 3	A checksum calculation is performed.
2	CONTROLLER	: 1	The HP-IB chip, Disc Controller chip, and buffer RAM are tested.
3	FLEXIBLE	: 3	A seek test, index period test, and a Write/Read compare on the system cylinder are performed on the flexible disc drive.
4	FLEXIBLE DISC DRIVE VERIFY	:40	All sectors in the data area of the disc are checked for CRC errors. No user data is affected.
5	FLEXIBLE DISC DRIVE FORMAT	1 :40	Formats disc.
6	WINCHESTER	7 :30	A thorough seek test, a W/R/compare on the system cylinder, and a recalibration is performed on the Winchester disc drive.
7	WINCHESTER VERIFY	2 :30	All sectors in the data area of the disc are checked for CRC errors. No user data is changed.
8	WINCHESTER CONNECTED	: 1	Checks to see if the Winchester is connected.
9	ECC		Checks the error correction portion of the Disc Controller chip.

If a Flexible disc drive test is selected on the HP 9154A/B, the test will fail.

[9] TROUBLESHOOTING PROCEDURES

(HP 9153/54A S/N Prefix 2702A and Higher as well as HP 9153/54B)

This section is divided into General information, a troubleshooting flowchart, procedures called out in the flowchart, repair verification, and use of the SS/80 Exerciser.

GENERAL INFORMATION

- If a flexible disc is damaged by the flexible disc drive (9153A/B), replace the drive mechanism.
- If the fan is not operating, check that the HP 9153/54 A&B is receiving primary power; that the voltage select switch is set correctly, and that the Primary fuse is good. Also check the power supply voltages. Use Figure 8-3 for location of voltage test points.
- If possible, determine whether the customer has been using HP double-sided media. If the customer is using media from other sources, or HP single-sided media in double-sided mode, it is possible that media could be the cause of the problem.

Some media related problems that have occurred are visible wear of the disc and a high pitched sound from the drive while the disc is being accessed. These problems have occurred when single-sided HP media is being used heavily in a double-sided drive (instead of its intended use to exchange data with single sided disc drives) and with media from other vendors. Note that the head resonance problem may be found occasionally as an independent failure mode.

Additional media related problems (HP 9153A/B) may occur such as failure to initialize media, and intermittent failures. In some cases, media may cause an accumulation of residue on the read/write head of the disc drive. It must be removed, if possible, before the drive will work properly with HP media. Heads may be cleaned using the 09122-89415 cleaning disc and the HD__CLN routine in the SS/80 Exerciser SERVC module to exercise the disc drive during the cleaning.

CAUTION

A precaution to be taken in troubleshooting the HP 9153/54A is that the drive mechanism, 45816-69111, is also a common part used to repair the 45816A (internal 20M byte drive in Vectra PC) with serial number prefix 2552A or higher. As the drive comes into the service pipeline, it can be used to service either the 45816A (Vectra) or the 9153/54A. However, if the drive is ever formatted in the HP 9153/54 A & B, it cannot then be used in a 45816A. In cases where there is a question whether the controller or the Winchester drive is defective, the controller should be substituted first, and then replaced with the original controller if it is not defective before replacing the Winchester disc drive.

NOTE

If a replacement Winchester is installed in the HP 9153A/B or HP 9154A/B, the power-on selftests will fail when the unit is powered up. The drive must be initialized (or formatted), and the unit power cycled before the FAULT LED will go off.

TROUBLESHOOTING FLOWCHART

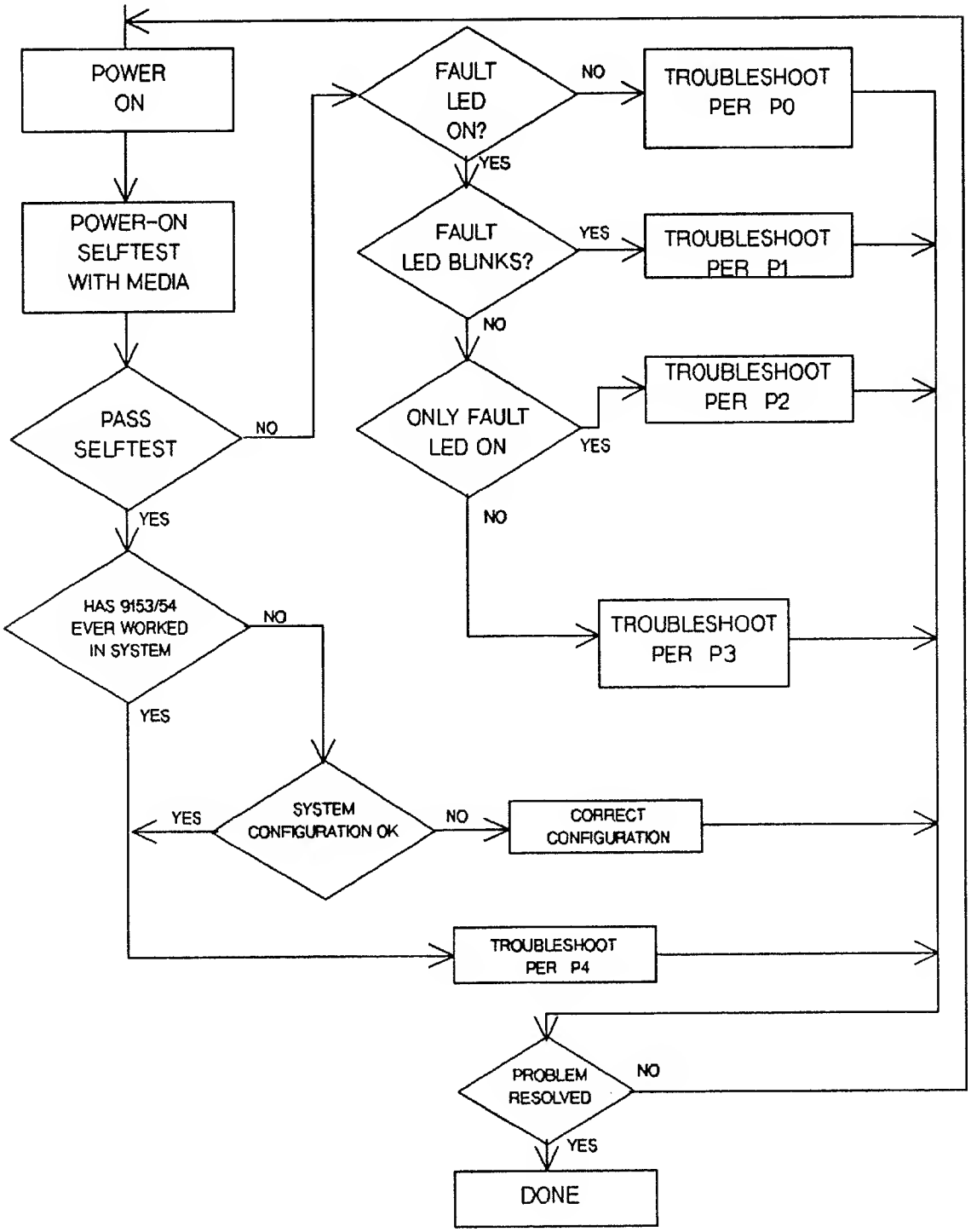


Figure 8-5. Troubleshooting Flowchart.

PROCEDURES P0 THROUGH P4

PROCEDURE P0 (LED's not on at power on)

1. Check primary fuse
2. Check setting of the primary voltage select switch (See Figure 8-9).
3. Check power supply voltages on the power supply PCA. (See Figure 8-3)
4. Check cables to power supply and drives.
5. Replace controller assembly if preceding steps do not correct problem.

PROCEDURE P1 (FAULT LED blinks)

The complete description of the power-on selftest indications is provided on page 8-6. The following information indicates the probable repairs if the FAULT LED is blinking at power on:

INDICATION	PROBLEM
FAULT LED on 6 seconds, blinks off 1 time, repeats	ROM checksum wrong. Replace ROM's or controller board
FAULT LED on 6 seconds, blinks off 4 times, repeats	Controller configuration switches set to an illegal configuration. Set switches for correct configuration for product. (See Figure 8-8)
All other FAULT LED blink indications	Controller fault. Replace the controller.

PROCEDURE P2 (FAULT LED on)

Drive access is indicated by the ONLINE indicator for the Winchester disc and by the ACCESS LED on the flexible disc drive front panel for the flexible disc drive. The ONLINE indicator will normally light momentarily at the time power is applied, then come on again at the time the drive begins spinning up and remain on for approximately 25 seconds during the power-on selftest. The ACCESS LED on the flexible disc drive will come on only if media is inserted in the drive, and will remain on for approximately 4 seconds.

NOTE

If the Winchester disc has just been replaced, it is necessary to format the drive and then cycle power before the product will pass the power-on selftest.

Neither drive accessed during selftest (9153A/B only)

1. Check power supply voltages (Figure 8-1)
2. Ensure that all cables are connected properly.
3. Ensure that configuration switch on the controller board is set correctly. (Figure 8-8)
4. Replace controller if none of the above correct the problem.

Winchester not accessed during selftest

Assure that the Winchester disc is spinning up. A very distinct audible indication occurs within the first 10 seconds after power is applied if the disc is spinning up.

1. Check power supply voltages (Figure 8-1)
2. Ensure that all cables are connected properly.
3. Ensure that configuration switch on the controller board is set correctly. (Figure 8-6)
4. Ensure that configuration switch on drive (See Figure 8-6) is set correctly.
5. Replace controller if none of the above correct the problem.
6. Replace the original controller in the product and replace drive if controller replacement does not correct problem.

Flexible disc not accessed during selftest (9153A/B only)

1. Ensure that a disc is installed into the flexible disc drive.
2. Check power supply voltages (Figure 8-3)
3. Ensure that all cables are connected properly.
4. Ensure that configuration switch on the controller board is set correctly. (Figure 8-8)
5. Ensure that configuration switch on drive (See Figure 8-6) is set correctly.
6. Replace controller if none of the above correct the problem.
7. Replace the original controller in the product and replace drive if controller replacement does not correct problem.

Both drives accessed during selftests (HP 9153A/B only)

It is possible that either a controller or drive can cause this fault. The two types of drives use some different circuits on the controller, and it is not always clear whether the controller or the drive is causing a problem related to apparent failure of a drive.

1. Place the FLOPPY section of SW3 to the ON position and repeat the power-on selftest. If the power-on selftest passes, replace the flexible disc drive. (Make sure the FLOPPY section of SW3 is returned to the proper position for the HP 9153A/B.)

2. If failure persists, return SW3 to the correct position and replace the controller PCA.

3. If the failure persists, replace the original controller in the HP 9153A/B and replace the Winchester disc drive.

PROCEDURE P3 (FAULT and ONLINE or FAULT and flex ACCESS LED's on)

Controller is the most probable defective assembly. Replace controller and re-test. If failure persists, replace the Winchester disc drive if the ONLINE LED is on, or replace the flexible disc drive if the flexible disc access light is on.

PROCEDURE P4 (Failure in system but passes power-on selftest)

Flexible disc failing

1. Determine whether HP double-sided media is being used in the system. Some media, including HP single-sided media, will not perform properly in the HP 9153A/B when the

flexible disc drive is used heavily.(If the disc has been used heavily with some types of media it is possible that the head may require cleaning before HP double-sided media will perform properly. The only means to do this is to use the SS/80 Exerciser on the HP 85.
2. Verify failure by using Test #4 (see page 8-8) on a customer data disc (verifies but does not change data) if read problems are occurring.
3. Check read/write performance using Test #5 on a scratch disc. (Formats the disc)

NOTE

Tests #4 and #5 will continue to loop until an error is detected, at which point the test will terminate and the FAULT LED will remain on continuously.

4. Replace drive if failure is indicated.
5. If failure persists, replace the original drive in the product and replace the controller board.

Winchester disc failing

1. Attempt to verify that failure is the Winchester disc using Test #7.
2. If Test #7 does not indicate a failure, replace the controller.
3. If failure persists, replace the original controller in the product and replace the Winchester disc drive.

Neither drive can be accessed

1. Replace controller board

REPAIR VERIFICATION

After repair of the product, the repair should be verified to ensure that the product is operating properly. If the test is on the flexible disc drive, format a disc using either a host computer which supports the product, the SS/80 Exerciser, or Service Selftest number 5. If the SS/80 Exerciser is available, the R/W_TEST module can be used to loop on a write/read test. Test number 5 formats a flexible disc, and will continue to loop on that test until the test fails, thus providing a means to exercise the product without operator intervention.

If the repair is on the Winchester disc drive and if there is no customer data on the disc, the repair can be verified by formatting the disc. If the disc has been divided into volumes, each volume must be formatted. If the customers data must be preserved on the disc, the R/W_TEST module in the SS/80 Exerciser provides a read-only test which will not affect customer data. Test number 7 also provides a verify test which will not affect customer data, and allows the test to execute continuously until an error is detected.

If the repair is on the controller, repair can be verified by performing write and read operations on both drives.

THE SS/80 EXERCISER

The SS/80 Exerciser provides some capabilities that are not available otherwise, and also provides more information about the HP 9153/54 A&B than is otherwise available. Specifically, the Exerciser provides the capability to transfer data and commands between a host computer and the peripheral, as well as performing certain tests which cannot be implemented in any other way.

Please refer to the SS/80 Exerciser manual, P/N 5958-4142 for an overview of the capabilities contained in the Exerciser.

Some general testing solutions which can be implemented using the Exerciser are as follows:

HP-IB channel test	The LOOPBAK test in the SERVC module tests the capability to communicate with the product across the HP-IB.
Testing for R/W errors	The R/W_TEST module allows either a Read Only, or a Write then Read test to be performed on a single unit. This test can be set to loop up to 32,000 times and allows extensive testing to identify a problem or verify a repair.
General product evaluation	The R/W_TEST module provides capability to perform general product testing and is recommended for this use.
Flexible disc tests	The SERVC module contains special flexible disc drive tests-motor speed, Track 0, Head cleaning routine, etc.
Complete product evaluation	The OPER program provides the capability to test all units and volumes of a disc drive without manually selecting each one. An OPER program can be defined which will select each unit and volume and then perform a locate and verify, locate and read, locate and write, etc. The program will allow looping to perform extensive testing.

If the drives are removed or replaced, refer to Figure 8-6 for the proper setting of the drive select switch.

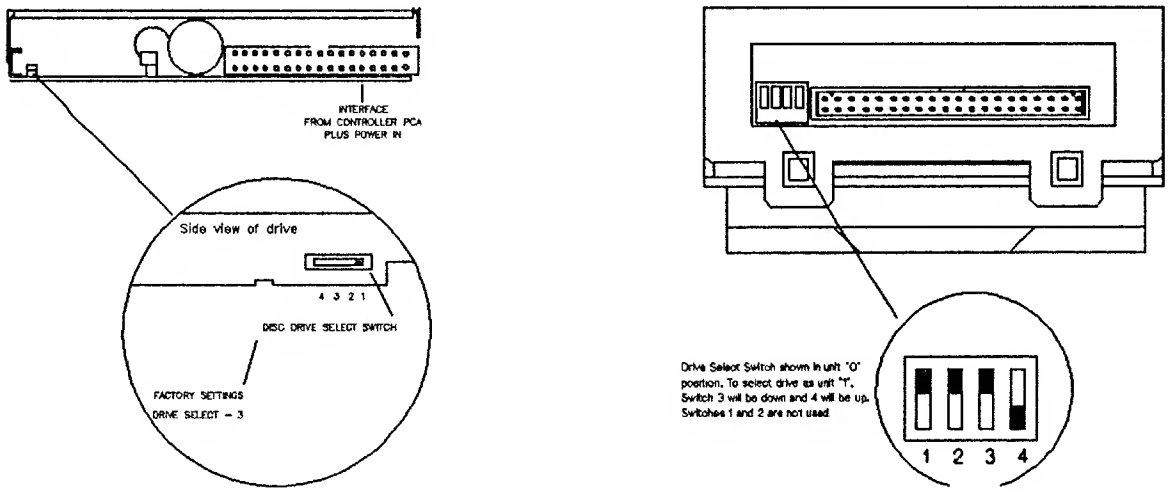


Figure 8-6. HP 9153/54 A&B drive configurations.

[10] CONNECTOR PIN DEFINITIONS

(HP 9153/54A S/N Prefix 2702A and Higher as well as HP 9153/54B)

3 1/2-inch Winchester Disc Drive

Pin #	Function
1	Read Data
2	Ground
3	Write Data
4	Ground
5	Write Gate
6	Ground
7	4 MHz Clock
8	Ground
9	Read A/D Converter
10	Ground
11	+5V
12	Ground
13	+5V
14	Ground
15	+12V for Motor
16	Ground for Motor
17	+12V for Motor
18	Ground for Motor
19	Drive Select 0
20	Drive Select 1
21	Drive Select 2
22	Drive Select 3
23	Write D/A Converter
24	NA/B
25	Sector Pulse
26	Index Pulse
27	Write NIC chip
28	Reset
29	+12V for Motor
30	+12V for Motor
31	Fault
32	+12V
33	Data Bus 7
34	Data Bus 0
35	Data Bus 6
36	Data Bus 1
37	Data Bus 5
38	Data Bus 2
39	Data Bus 4
40	Data Bus 3

3 1/2-inch Flexible Disc Drive

Pin #	Function
1	Disk Change Reset
2	Disk Change Indicator
3	+5V
4	In Use
5	+5V
6	Drive Select 3
7	+5V
8	Index Pulse
9	+5V
10	Drive Select 0
11	+5V
12	Drive Select 1
13	Ground
14	Drive Select 2
15	Ground
16	Motor On
17	Ground
18	Direction Select
19	Ground
20	Step
21	Ground
22	Write Data
23	Ground
24	Write Gate
25	Ground
26	Track 0 Indicator
27	Ground
28	Write Protect Indicator
29	+12V
30	Read Data
31	+12V
32	Head Select
33	+12V
34	Ready

Power Connector (Controller PCA)

Pin #	Function
1	+12V Misc
2	+12V for Nighthawk Motor
3	Ground for Nighthawk Motor
4	Ground for +12V Misc
5	PVAL signal from Power Supply
6	Mechanical Key
7	Ground for +5V
8	+5V

Figure 8-7 shows the cable interconnect for the HP 9153/54A.

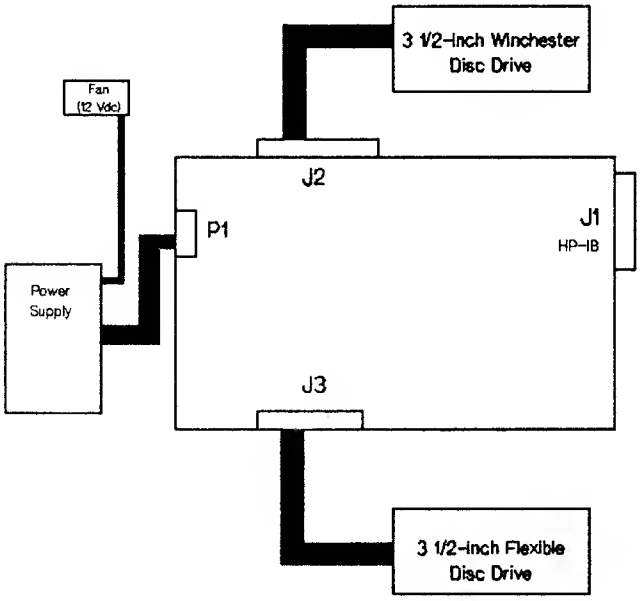
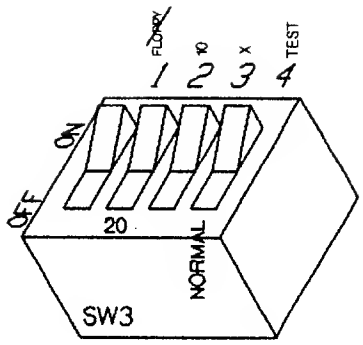


Figure 8-7. Cable Interconnect.

HP-IB Connector

Pin #	Function
1	Data Bus 1
2	Data Bus 2
3	Data Bus 3
4	Data Bus 4
5	EOI
6	Data Valid
7	Not Ready For Data
8	Not Data Accepted
9	Interface Clear
10	Service Request
11	Attention
12	Chassis Ground
13	Data Bus 5
14	Data Bus 6
15	Data Bus 7
16	Data Bus 8
17	Remote Enable
18	Ground
19	Ground
20	Ground
21	Ground
22	Ground
23	Ground
24	Ground



SWITCH LABEL				HP 9153A and HP 9154A CONFIGURATION
FLOPPY	10	X	* TEST	
OFF	ON	OFF	OFF	10M BYTE HARD DISC WITH FLEXIBLE DISC
ON	ON	OFF	OFF	10M BYTE HARD DISC W/O FLEXIBLE DISC
ON	ON	ON	OFF	DONT CARE (UNUSED)

SWITCH LABEL				HP 9153B/HP 9154B CONFIGURATION
FLOPPY	10	X	* TEST	
OFF	OFF	OFF	OFF	20M BYTE HARD DISC PLUS FLEXIBLE DISC
ON	OFF	OFF	OFF	20M BYTE HARD DISC W/O FLEXIBLE DISC
OFF	ON	OFF	OFF	VIRTUAL 10M BYTE HARD DISC WITH FLEXIBLE DISC
ON	ON	OFF	OFF	VIRTUAL 10M BYTE HARD DISC W/O FLEXIBLE DISC
ON	ON	ON	OFF	DONT CARE (UNUSED)

* Used to initiate service selftest routines.

Figure 8-8. Drive Configuration switch.

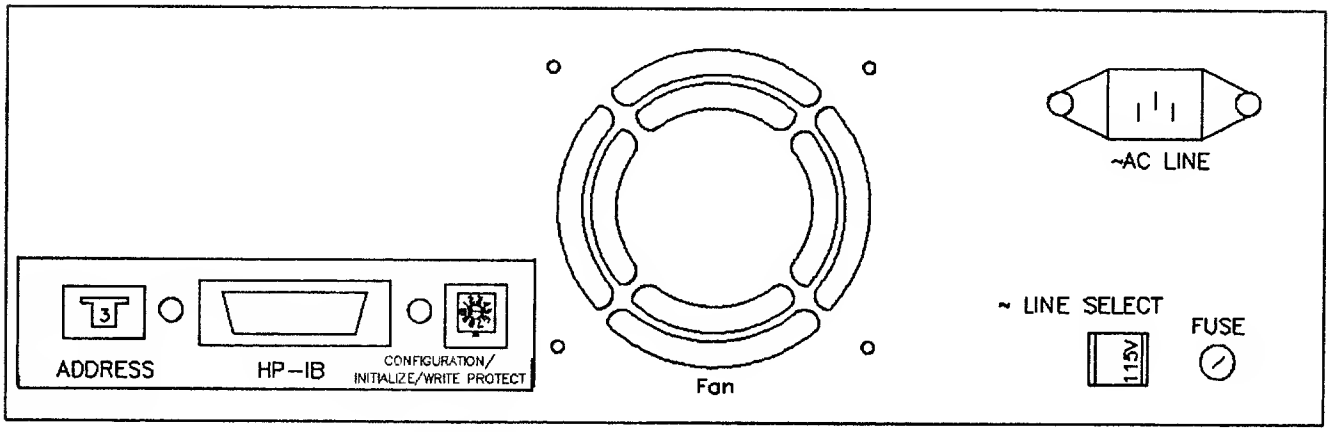


Figure 8-9. Rear View of HP 9153/54A.

REPLACEABLE PARTS

CHAPTER 9

[1] PARTS LIST (HP 9153/54A S/N Prefix 2515A and below)

In the following parts list, the major assemblies are designated by the number "1". All piece parts of that major assembly are designated by a decimal number ".2", and lower level parts by ".3" etc.
Refer to figure 9-1.

LEVEL	REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
	Use Figure 9-1 for parts location.		**EXCHANGE ASSEMBLIES**
1	2	09114-69511	3 1/2-inch FLEX DISC DRIVE
1	A3	09153-69502	CONTROLLER PCA
1	3	09153-69121	3 1/2-inch WINCHESTER DRIVE
			NON-EXCHANGE ASSEMBLIES
1	A2	09153-67501	POWER SUPPLY
1	A5	09153-67503	HP-IB BOARD
1	4	09125-68500	FAN
			CASE PARTS
1		0400-0179	GROMMET
1		0403-0427	BUMPER FOOT
1		0515-1577	M4X.7 8MM SCREW
1		0515-1344	M4X.7 5MM SCREW
1		0515-0353	M3X.5 8MM SCREW
1		0624-0525	10-14 SELF-TAPPING SCREW
1		09121-48303	MOLDED FOOT
1		09125-68500	FAN ASSEMBLY
1		09153-00110	CHASSIS
1		09153-00600	EMI SHIELD
1		09153-04100	TOP COVER
1		09153-04102	DRIVE MOUNTING PLATE
1		09153-04700	DRIVE SUPPORT
1		09153-40200	FRONT PANEL
1		09153-43700	PUSH ROD
1		09153-43701	LIGHT PIPE
1		09153-68801	LINE FILTER ASSEMBLY
1		09153-84300	FRONT PANEL LABEL
1		09153-84301	2.0 A FUSE LABEL
1		09153-84302	1.0 A FUSE LABEL
1		2110-0001	1A 250V FUSE
1		2110-0002	2A 250V FUSE
1		5041-1203	POWER BUTTON

1	5180-0001	UL LABEL
1	8120-1378	POWER CABLE
1	9100-4488	TRANSFORMER

ROMS

1	09153-89102	U15
1	09153-89103	U7

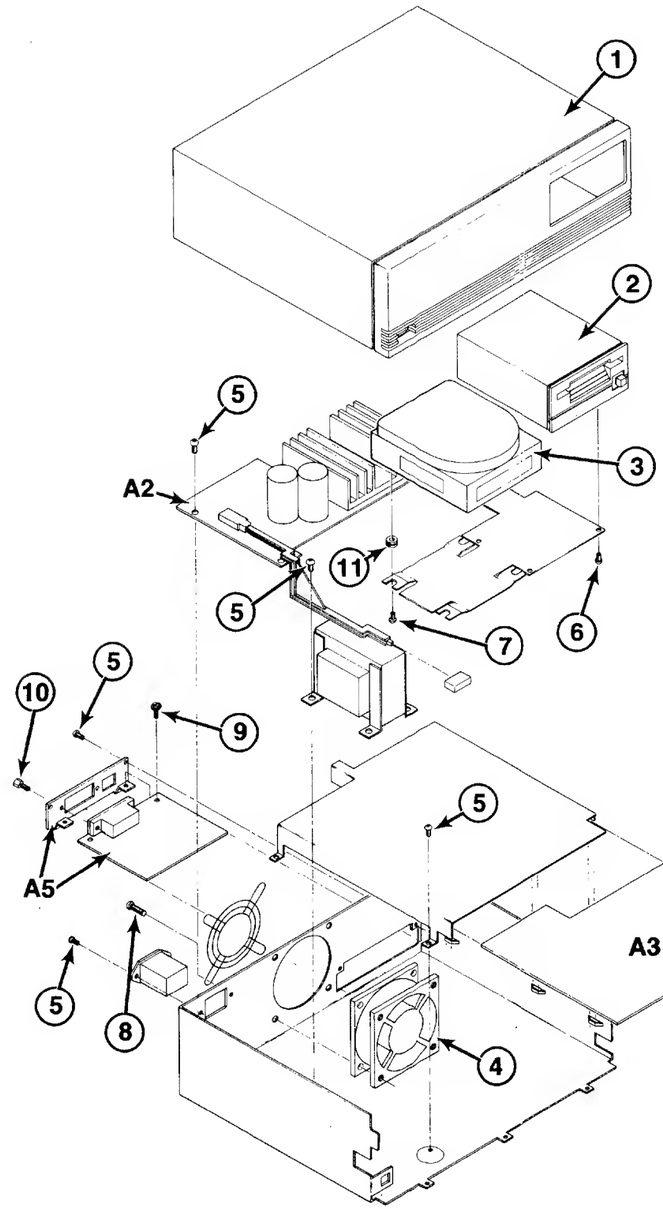
CABLES

1	09153-61600	FLEX DISC CONTROL CABLE
1	09153-61601	POWER CABLE
1	09153-61602	WINCHESTER DRIVE CONTROL CABLE

POWER CORDS

1	9153A #900	UK POWER CORD
.2	8120-1351	POWER CABLE
.2	8120-1378	POWER CABLE
1	9153A #901	AUSTRALIAN POWER CORD
.2	2110-0001	1A 250V FUSE
.2	2110-0002	2A 250V FUSE
.2	8120-1369	POWER CABLE
.2	8120-1378	POWER CABLE
1	9153A #902	EUROPEAN POWER CORD
.2	2110-0001	1A 250V FUSE
.2	2110-0002	2A 250V FUSE
.2	8120-1378	POWER CABLE
.2	8120-1689	POWER CABLE
1	9153A #904	US 240V CORD
.2	2110-0001	1A 250V FUSE
.2	2110-0002	2A 250V FUSE
.2	8120-0698	NEMA 6-15 CORD
.2	8120-1378	POWER CABLE
1	9153A #905	CEE 22 POWER CORD
.2	8120-1378	POWER CABLE
.2	8120-1575	POWER CABLE
1	9153A #906	SWISS POWER CORD
.2	2110-0001	1A 250V FUSE
.2	2110-0002	2A 250V FUSE
.2	8120-1378	POWER CABLE
.2	8120-2104	POWER CABLE
1	9153A #912	DENMARK POWER CORD
.2	2110-0001	1A 250V FUSE
.2	2110-0002	2A 250V FUSE
.2	5180-0001	UL LABEL
.2	8120-1378	POWER CABLE
.2	8120-2956	CABLE ASSEMBLY

1	9153A #917	SOUTH AFRICA POWER CORD
.2	2110-0001	1A 250V FUSE
.2	2110-0002	2A 250V FUSE
.2	8120-1378	POWER CABLE
.2	8120-4211	CORD SET



A2 – 09153-67501
A3 – 09153-69502
A5 – 09153-67503

(1) – 09153-04100
(2) – 09114-69511 (9153A ONLY)
(3) – 09153-69121
(4) – 09125-68500
(5) – 0515-1343
(6) – 0515-1346
(7) – 0515-1345
(8) – 0624-0525
(9) – 0624-0643
(10) – 0380-1717
(11) – 0400-0285

Figure 9-1. Field Replaceable Assemblies:
HP 9153/54A with S/N Prefix 2515A and below.

[2] PARTS LIST (HP 9153/54A S/N Prefix 2702A and Above and HP 9153/54B)

Refer to figure 9-2.

LEVEL	REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
	Use Figure 9-2 for parts location.		**EXCHANGE ASSEMBLIES**
1	A2	09123-69101	FLEXIBLE DISC DRIVE
1	A3	09153-69530	CONTROLLER PCA
1	A1	45816-69111	3 1/2-inch WINCHESTER DISC DRIVE
			NON EXCHANGE ASSEMBLIES
1	A7	09153-67110	POWER SUPPLY
1	A5	09144-68501	FAN
			CASE PARTS
1	A6	09153-04100	TOP COVER
1		09153-40200	FRONT PANEL
1	A8	09153-00101	CHASSIS
1	A4	09153-04702	DRIVE MOUNTING BRACKET
1	A10	09153-40600	POWER SUPPLY SHIELD (TOP)
1	A11	09153-40601	POWER SUPPLY SHIELD (BOTTOM)
1		09153-04104	HP-IB PLATE
1		0403-0427	BUMPER FOOT
1		09121-48303	FOOT-MOLDING
1	A12	09153-04704	DRIVE MOUNTING BRACKET
1	A13	09153-04705	DRIVE MOUNTING BRACKET
			ROMs
1		09153-89110	U28
1		09153-89210	U29

LEVEL	REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
	USE figure 9-2 for parts location		**CABLES**
	7	09153-61603	FLEXIBLE DISC DRIVE
	6	09153-61604	3 1/2-inch WINCHESTER
			SCREWS
.2	1	0624-0661	
.2	2	0515-1578	
.2	3	0515-1251	
.2	4	0515-1746	
.2	5	0380-1717	
			ELECTRICAL ASSEMBLIES
1	A7	09153-67110	POWER SUPPLY
1	A3	09153-69530	CONTROLLER PCA
1	A9	09153-68802	LINE FILTER
1	A5	09144-68501	FAN

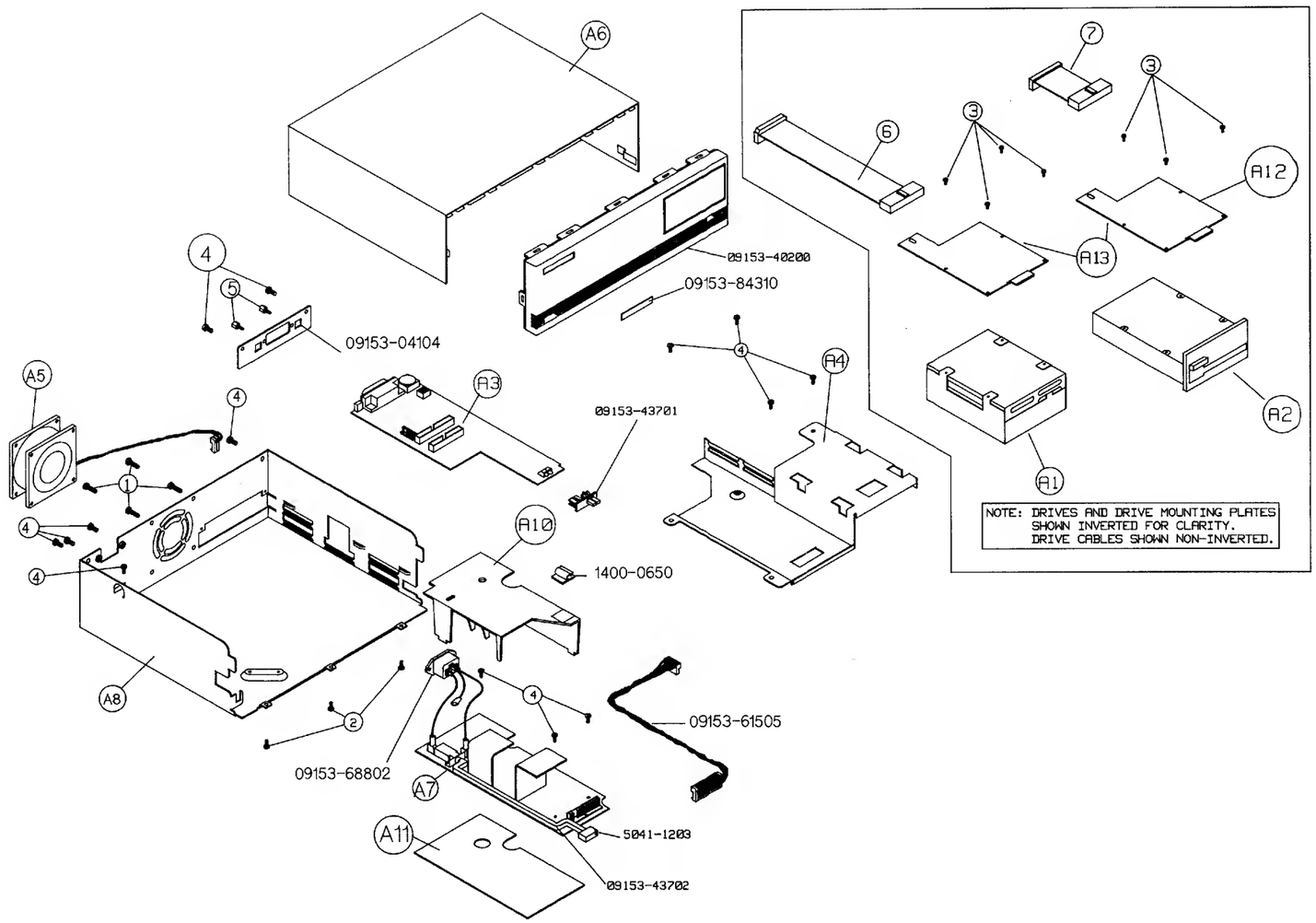


Figure 9-2. Field Replaceable Assemblies:
HP 9153/54A with S/N Prefix 2702A and above, and all HP 9153/54B.

REFERENCE

CHAPTER 10

[1] SERVICE NOTES

The service notes issued against the HP 9153/54 A and B products are provided at the end of this chapter for reference. These service notes cover HP 9153/54 A and B products having a S/N prefix of 2450A and above.

SERVICE NOTE

9153A

DISC DRIVE

Serial number:
ALL PREFIX 2450A

POSSIBLE DATA LOSS ON 3.5 INCH WINCHESTER

Supersedes: NONE

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: X On Failure:	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:	X		
SERVICE INVENTORY:	Return for Update: X	Use as is:	
	Return for Salvage:	See Text:	
WARRANTY EXTENDED UNTIL:		MAY 1 1986	

Situation:

It is possible when writing to the 3.5 Inch Winchester to overwrite the header on an adjacent physical record of the disc. The corrupted record may not be used in the write operation being performed, which means that a failure might not be reported until an access is attempted to the corrupted record. If the failure occurs while updating the directory, the drive would have to be re-initialized before it would be accessible. The failure has only been seen when performing a DMA transfer with a series 200 with a high speed interface and processor. We can not guarantee that the failure will not occur on all other present and future configurations.

Solution

The E-PROMs are being updated to guarantee the hard disc controller chip is in a known state when the sector address is passed to it. The part number of the new E-PROMS will be 09153-89105 and 09153-89205. Units which have had the firmware updated to correct this problem will have Serial Number prefix 2515A or higher. Less than 150 units were shipped with the earlier firmware revision.

Warranty:

Units which have the problem described will also have a possibility of having the drive defect described in service note 9153A-2. As both these situations require immediate update and the update would be extremely costly in the field, units which have Serial Number prefix 2450A will be warranty replaced. If a 9153A with Serial Number prefix 2450A is found, contact Greeley Division on-line

KK
06/03/85

HEWLETT PACKARD

FOR MORE INFORMATION, CALL YOUR LOCAL HP SALES OR SERVICE OFFICE or East (201) 265-5000, Midwest (312) 255-9800, South (404) 955-1500, West (213) 970-7500 or (415) 968-9200 OR WRITE,Hewlett-Packard,1820 Embarcadero, Palo Alto, California
IN EUROPE, CALL YOUR LOCAL HP SALES or SERVICE OFFICE OR WRITE, Hewlett-Packard S.A.,7,rue du Bois-du-Lan,P.O. Box, CH-1217 Meyrin 2-Geneva,Switzerland. IN JAPAN, Yokogawa-Hewlett-Packard Ltd., 1-27-15, Yabe Sagamihara City, Kanagawa Prefecture, Japan 229.

SERVICE NOTE

9153A

DISC DRIVE

Serial number:
ALL SERIAL PREFIX 2450A

Potential Failures of 3.5 Inch Winchester Mechanism PN09153-69101

Supersedes: NONE

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: X On Failure:	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:	X		
SERVICE INVENTORY:	Return for Update: X Return for Salvage:	Use as is: See Text:	
WARRANTY EXTENDED UNTIL:		May 1 1986	

Situation:

9153A Disc Drives with serial number prefix 2450A were shipped with winchester mechanisms which can exhibit two known failure modes.

1: An accelerator which was used to speed curing time of an adhesive has been found to "outgas" over time and leave deposits on the media which can cause a "stiction" problem. (head sticks to the media) The drive will either time-out or the head will be damaged or broken off.

2: One of the interconnect wires between spindle motor coils may short to a mounting screw on these units, causing overheating and eventually an open circuit.

Solution

Units with serial number prefix 2515A and higher have winchester drives which did not use the accelerator and the routing of the motor wiring has been modified to ensure that no possibility of a short exists. The exchange part number of drives which will not have these problems is being changed to 09153-69111. Return all service inventory of Drive PN09153-69101 and reorder PN09153-69111. Approximately 35 service assemblies and less than 150 customer units were shipped which may exhibit these problems.

KK
06/4/85

Warranty

Units with the drive problems described also have the possibility of having the controller problem described in service note 9153A-1. As both these situations require immediate update and the update would be extremely costly to perform in the field, units with serial prefix 2450A will be warranty replaced. If a 9153A with serial number prefix 2450A is found, contact Greeley Division on-line service support to arrange a warranty replacement. The telephone number is 303-350-4453.

KK
06/4/85

S E R V I C E N O T E

Supersedes: SUPERSEDES:

APPLIES TO:	All Units X		Only Units on Agreement ☐
PERFORM:	Immediately ☐		At PM/Normal Call ☐
	On Failure ☐		Information Only X
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE	Return for update ☐		Use as is ☐
INVENTORY	Return for salvage ☐		See text X
WARRANTY EXTENDED UNTIL:			

9153A
3 1/2 Inch Double Sided
Floppy Disc Drives

New Shipping Disc

Situation:
The 3 1/2 inch double sided disc drive PN 09114-69511 has been changed by Sony to improve performance and reliability from a -10 drive to a -11 drive. The new date codes on these drives will be 2513 or 2514. The older date codes on these drives were 2418 or 2432. The newer drives have a plastic shipping disc that has been designed especially for these newer drives, but is backward compatable with the older drives. All the double sided drives are now being shipped with the new plastic shipping disc. The older cardboard shipping disc PN 1535-4881 can be used with both the newer and older drives. The new plastic shipping disc will also have part number 1535-4881. The old cardboard shipping disc does not eject as smoothly as the new plastic disc in the new drives, but careful handling when removing the disc from the drive will not damage the drive.

Implementation:
CPC will use up all old cardboard shipping discs. No action on FSI because the old cardboard shipping discs can used on either drive. Use up all FSI before using new shipping discs.

RP/tm

06/20/85 - 5800

9320-4766 (1/83)

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SERVICE NOTE

9153A

DISC DRIVE

Serial number:
ALL

09153-69502 DATE CODE 2524 AND EARLIER: POTENTIAL +12 VOLT SHORT

Supersedes: NONE

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure: X	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	X		
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is:
	Return for Salvage:		See Text: X
WARRANTY EXTENDED UNTIL:	08/01/86		

Situation:

Controller PCA PN09153-69502 is held in place by metal PC guides which are part of the 9153A chassis. The 12 Volt trace on this assembly runs close to the edge of the board which the chassis guides support. If the solder resist on this trace flakes off, the potential for a 12 Volt short exists. Solder adhering to an exposed section of the 12 Volt trace increases the risk of a short. The 12V fuse on the power supply will blow if this trace shorts to the chassis.

Solution:

Controller boards with date code 2525 and later have 1/2 Inch electrical tape over the 12V trace. (Ref. Fig. 1) If a 12V fuse problem is found in a 9153A, inspect the 09153-69502 PCA to ensure that these traces have been covered with tape per Fig. 1. Tape PN0460-0193 has been approved for use in this application.

Warranty:

Greeley Division will accept 1 hour labor on extended warranty when a Controller PCA PN09153-69502 is modified to correct a 12V fuse problem. All service inventory shipped was date code 2525 or later.

KK
06/18/85

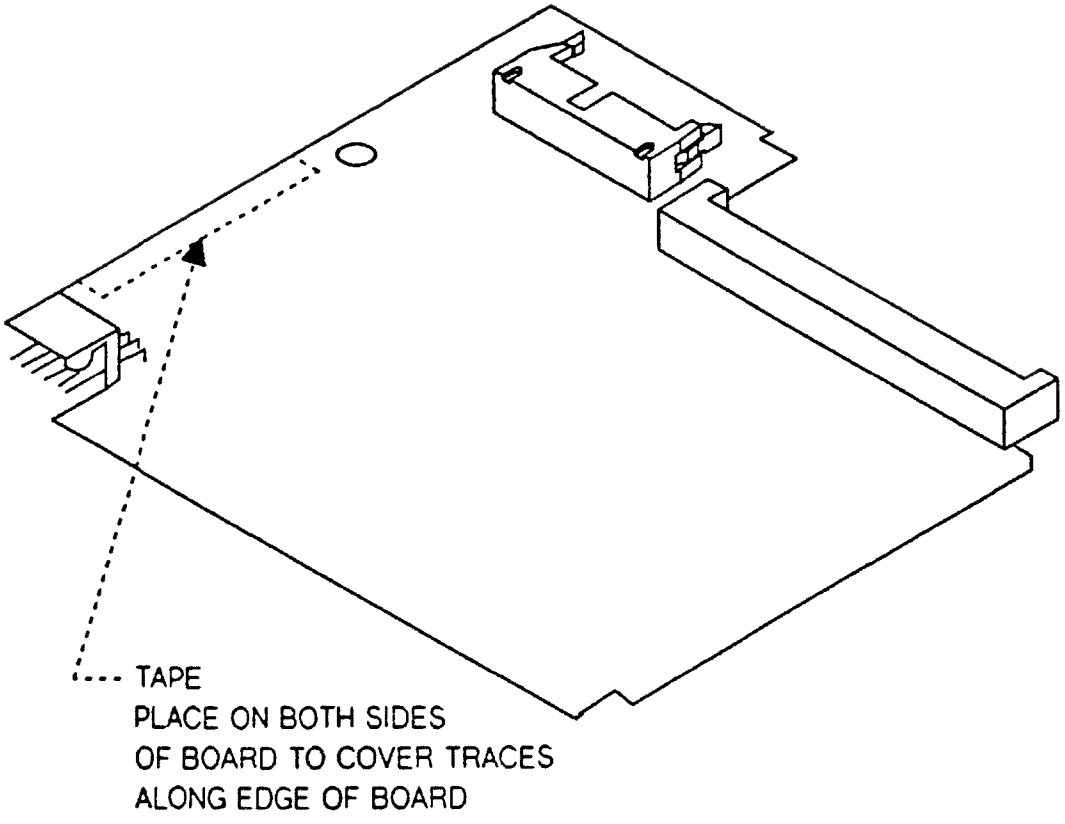
TAPE
PLACE ON BOTH SIDES
OF BOARD TO COVER TRACES
ALONG EDGE OF BOARD

FIGURE 1

SERVICE NOTE

9153A

3 1/2 In. Double Sided Floppy Disc Drive

Serial number:
All

Top Head Damage of the Drive Mechanism HP part number 09114-69511.

Supersedes:

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only:X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:		X	
PARTS:		X	
TRAVEL:		X	
SERVICE INVENTORY:	Return for Update:	Use as is:	
	Return for Salvage:	See Text:X	
WARRANTY EXTENDED UNTIL:	N/A		

Situation:

Top head damage is occuring on the Sony drive mechanism (09114-69511) used in this unit. This top head damage could cause: 1. Scratching of media. 2. Failing self tests. 3. Not being able to read or write data on media. 4. Intermittent failures.

Cause:

The new plastic shipping disc, HP part number 1535-4881, used in this drive may become partially ejected, due to shock of shipment. When the shipping disc becomes ejected without first pressing the eject button, the cassette up assembly is still in the head load position. Since the heads are then loaded incorrectly on the shipping disc, vibration and shock can easily damage the heads. Other damage could occur if the customer perceives that the shipping disc, although slightly ejected, is ready to install or remove from the drive. When the disc or media is installed or ejected without first pressing the eject button to unload the heads, head damage can occur. This damage may be either loosening of the top head causing failures at a later date or tearing out the top head completely causing a DOA.

It is also possible for media to become partially ejected from the mechanism due to shock and vibration. The same cautions regarding removal and insertion of partially ejected shipping discs also applies to media.

RP
9-23-85

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Solution:

1. If the drive is moved or shipped, customers should install a rubber wedge into the drive above the shipping disc to prevent the shipping disc from ejecting. The HP part number of the rubber wedge is 9223-0648.

2. Educate customers regarding removing and installing the shipping disc or media into the drive without first depressing the eject button. New products will contain an instruction sheet explaining the situation. The part number of the instruction sheet is 09114-90036.

FSI: All 09114-69511 drives shipped from CSR and CSE will have the rubber wedge and instruction sheet with the drive. All drives in FSI should have the rubber wedge installed immediately. Any drives received in FSI with the shipping disc ejected should be returned to CSR or CSE. No drive mechanisms should be shipped without the rubber wedge.

RP
9-23-85

SERVICE NOTE

9153A

Disc Drive

Serial number:
All

50 Hz Interference from 9153A Transformer to Display of Touch Screen II

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure: X		At PM/Normal Call: Information Only:
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	X		
PARTS:	X		
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is: X
	Return for Salvage:		See Text:
WARRANTY EXTENDED UNTIL:	March 1 1986		

Situation:

The CRT refresh rate of the Touch Screen II makes it very susceptible to interference when used in countries with 50 Hz power line frequency. The 9153A can cause CRT distortion when used with the Touch Screen II in these countries.

Solution:

A new transformer, which reduces distortion of the Touchscreen II CRT, is being used in units which have the 50 Hz power option. The 9153A Serial Number prefix will not be changed because all units will not use this transformer immediately. Option 903 (U.S. power cord) will continue using the original transformer to reduce scrap at GLD.

HP Part Number of original transformer = 9100-4419 (Possible distortion in 50 Hz applications)

HP Part Number of new transformer = 9100-4488

If a customer complains of CRT distortion on the TouchScreen II in areas with 50 Hz power, replace transformer PN 9100-4419 with PN 9100-4488 after verifying the 9153A as the source of the interference.

Warranty:

Greeley Division will accept 1 hour labor and parts cost when a customer complains of CRT distortion on his Touchscreen II in a country with 50 Hz power.

Note: Travel not allowed unless system has on-site warranty.

KK
10/28/85

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SERVICE NOTE

9153A

Disc Drive

Serial number:
All

Power Supply Failure Weakens or Damages Other Assemblies

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure: X	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	See Text		
PARTS:	See Text		
TRAVEL:	See Text		
SERVICE INVENTORY:	Return for Update:	Use as is: X	
	Return for Salvage:	See Text:	
WARRANTY EXTENDED UNTIL:	See Text		

Situation:

A power supply failure has been seen that applies 30 Volts to the 12 Volt line of the 9153A. In all cases this failure mode has also caused damage to the 3.5 inch winchester mechanism. In addition, components of the 3.5 Inch flexible drive, the fan and the main controller PCA are stressed above their design limits. The failure mode has been, "the fan running at a greatly accelerated rate" and "a loud pop and the smell of smoke". In cases where these symptoms or other component damage occurs in conjunction with a defective power supply, the +12 Volt test point on the power supply should be checked. If approximately 30V is present at this point, the following assemblies need to be changed to assure the product will not fail at a later date due to stressed components.

1. Controller PCA PN09153-69502
2. Power Supply PN09153-69501
3. 3.5 Inch Flexible disc Drive PN09114-69511
4. 3.5 Inch Winchester Drive PN09153-69111
5. Fan PN09125-68500

Solution:

The extent of the damage involved when the power supply fails in this manner makes the repair impractical to perform in the field. The repair cost would be higher than the manufacturing cost of a new unit. In cases where +12 Volts has been verified to be at approximately +30 Volts, Greeley Division will authorize a warranty replacement for the customer unit. Contact the Greeley Division Support line, telephone 303-350-4453, to get instructions for obtaining a replacement unit.

Warranty:

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10/28/85

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SERVICE NOTE

9153A

Disc Drive

Serial number:
All

Format Option Information For Using Exerciser Tape PN5010-0310 to Initialize a 9153A

Supersedes: None

APPLIES TO:	All Units: X		Only Units on Agreement/Warranty :
PERFORM:	Immediately: On Failure:		At PM/Normal Call: Information Only:X
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is:X
	Return for Salvage:		See Text:
WARRANTY EXTENDED UNTIL:	NA		

Situation:

The Initialize routine accessible in the Service sub-program of the SS/80 Exerciser tape, PN5010-0310, requires 1 of 3 spares table options to be selected before the initialization is performed. Option 2 clears both the factory and field spares tables. The information in the field spares table is created at the factory and cannot be recreated in the field.

Solution:

Format option 2 should never be selected when initializing a 9153A. If format option 2 is selected, the drive has to be returned as defective. Option 0 (Initialize retaining all spares information) or 1 (Initialize clearing field spares information, but retaining all factory spares information) are the only options which should be used on this product. Option 2 is not selectable through any standard HP operating system. The SS/80 Exerciser and any customer written mass storage driver are the only possible problem areas. An additional Initialize utility in the Manual subprogram of the SS/80 Exerciser tape initializes the winchester drive using option 0.

KK
03/24/86

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SERVICE NOTE

9153A

Disc Drive

Serial number:
NA

3.5 Inch Disc Drive PN 09153-69111
Changes to 09153-69121

Supersedes: None

APPLIES TO:	All Units ■		Only Units on Agreement/Warranty ☐
PERFORM:	Immediately ☐		At PM/Normal Call ☐
	On Failure ☐		Information Only ■
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE	Return for update ☐		Use as is ☐
INVENTORY	Return for salvage ☐		See text ■
WARRANTY EXTENDED UNTIL: N/A			

Symptom:

Some 3.5 Inch Winchester Drives, PN09153-69111 may fail to spin up at power-on. The host will report an error message indicating that the drive cannot be found or that it is unable to access the drive. The exact error message received is dependent on the host computer used. The failure mode can also be recognized by listening to determine if the motor is actually spinning up.

Cause:

3.5 Inch Winchester drives with electrical date code 2521 or lower were manufactured using a lubricant that can outgas or migrate into the head/media chamber under certain circumstances. This can leave a residue on the disc surface that can cause the head to adhere to the surface, prohibiting the motor from spinning. A substantial outgassing is required to cause a functional problem. Customer units that have had this problem have been early failures. The drives which were manufactured with this lubricant can also be identified by a serial number located on a bar code label on the side of the mechanism. Units with Serial 9000 and above or electrical date code 2537 and above did not use the lubricant anywhere in the manufacturing process.

Solution:

Inspect all F.S.I of PN09153-69111. Return all units with electrical revision date code 2521 and lower or serial number 8999 and lower and reorder PN09153-69121. F.S.I with date code 2537 or serial numbers 9000 and higher should be relabeled with PN 09153-69121 and returned to F.S.I.

The failure has occurred at delivery or very shortly after on customer units. Therefore, no installed base action is planned.

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03/24/86

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If this failure occurs on a customer unit where it is important to attempt to recover the customer data, it is possible to break loose the motor and attempt to back up the data. A non-conductive tool can be inserted into the opening of the drive opposite the bar code label and used to break loose the motor by forcing the finned part attached to the motor to spin. This should be done with power applied to the unit. **Use caution as the motor will spin up to speed rapidly once the head/media adhesion is broken.**

SERVICE NOTE

9153A

Winchester\ 3 1/2 Inch Floppy Disc Drive

Serial number:
See below

New shipping disc

Supersedes: N/A

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only: X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:	Use as is:	
	Return for Salvage:	See Text: X	
WARRANTY EXTENDED UNTIL:	N/A		

Situation:

There is a new improved shipping disc available for both the full height (09114-69511) and the slim line (09123-69101) 3 1/2 inch floppy discs. This new shipping disc has a sliding lock attached to the plastic disc which eliminates the need for the rubber wedge (9223-0648) that is required on the old shipping disc (1535-4881).

Solution:

All products will ship with the new shipping disc starting approximately Mar 1, 1987. The new shipping disc will have part number 1150-1786 for the full height drive (09114-69511) or 9153A's with serial number prefix below 2702A. The part number is 1150-1787 for the shipping disc used on the slim line drive (09123-69101) or 9153A's with serial number 2702A and above.

PCE and CPC will use up the old shipping disc before supplying the new ones. There will be NO upgrade, users must purchase the shipping discs if needed.

RP
2-24-87

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SERVICE NOTE

9153A

3.5 Inch Winchester Disc Drive

Serial number:
2702A and Above

New Assembly Part Numbers

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only: X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:	Use as is:	
	Return for Salvage:	See Text: X	
WARRANTY EXTENDED UNTIL:	NA		

Situation:

Starting with Serial Prefix 2702A, the 9153A will be manufactured with all new assemblies. With the exception of a controller jumper setting and factory recorded servo information on the 3.5 inch winchester mechanism the new assemblies are the same as are being used in the manufacture of the 9153B.

To minimize field stocking requirements the exchange drive for the new 9153A will be the same as is required for the 9153B. 9153A's with serial prefix 2702A and higher require the same repair assemblies as the 9153B.

Solution:

Reference the table below for part numbers for assemblies required to service the 9153A.

	Prefix 2515 and Lower	Prefix 2702A and Higher
Controller PCA	09153-69502	09153-69520 (Includes HP-IB)
Winchester Mechanism	09153-69121	45816-69111
3.5 Inch Flex Drive	09114-69511	09123-69101
HP-IB Board	09153-67503	NA
Power Supply	09153-67501	09153-67110
	Reference Service Manual PN5958-4122 for additional PN information.	Reference 9153B Service Manual Insert PN5958-4122 for Additional PN information.

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04/03/87

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SERVICE NOTE

9153A

3.5 Inch Disc Drive

Serial number:
2702A18000 to 2702A19992

Power On Self Test Failure

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure: X	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	X		
PARTS:	X		
TRAVEL:	See Text		
SERVICE INVENTORY:	Return for Update:		Use as is:
	Return for Salvage:		See Text: X
WARRANTY EXTENDED UNTIL:	June 1 1986		

Situation:

9153A Disc Drives with serial number prefixes of 2702A18000 through 2702A19992 will fail power on self test or the initiate diagnostic command if a flexible disc formatted with 1024 Byte sectors is inserted during these operations.

During power on self test and initiate diagnostic execution, a sector is read from the flexible disc (if inserted) and stored in a RAM buffer. Controller PCA PN09153-69520 with EPROM's 09153-89109/89209 or lower only allocate 512 Bytes of RAM to store this information. If a flexible disc which has been formatted with 1024 Byte sectors is inserted in the 9153A during these operations, the 9153A attempts to store 1024 Bytes. This overwrites system information causing the unit to hang. If the disc is removed from the flexible disc drive before power-on, further operations can be performed normally.

Solution:

Controller PCA PN09153-69530 has a firmware change which does a CRC Byte compare during this operation and does not store any data in RAM. This corrects the problem.

This problem only occurs if the flexible disc is formatted with 1024 Byte sectors and is inserted during power up self test or when an Initiate Diagnostic command is issued.

A firmware upgrade kit PN09153-89902 is set up at CPC/PCE to allow field upgrade of F.S.I. The kit contains EPROMs PN09153-89110 and 89210, an instruction sheet and a 09153-69530 PN label to identify upgraded assemblies.

Customer units should be upgraded on failure only. The firmware will not solve any problems unless the customer is using flexible discs that have been formatted with 1024 Byte sectors. The most common useage of 1024 Byte sectors on the flexible disc is in UNIX sytems.

Warranty:

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05/08/87

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Greeley Division will authorize 0.5 hours of labor and cost of the upgrade kit PN09153-89902 to perform upgrade of field service inventory.

"On complaint only" 1.0 hours of labor and the cost of the kit may be charged as extended warranty per this service note for customer failures.

Travel is authorized only if the 9153A was purchased as #W03 (90 day on-site factory warranty) or if the customer has purchased a service contract which includes on-site repair.

KK
05/08/87

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SERVICE NOTE

9153A

Disc Drive

Serial number:
Prefix 2702A and Above

Volume Configuration Settings

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only: X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:	Use as is: X	
	Return for Salvage:	See Text:	
WARRANTY EXTENDED UNTIL:			

Situation:

9153A Disc Drives with serial number prefix 2702A and above have a volume configuration switch setting accessible on the back of the unit. Units with lower prefixes had a 4 position DIP switch located on the HP-IB personality module to allow 4 volume partition options. (Reference pages 3-7 and 3-8 of the 9153A Service Manual PN5958-4122 for a description of this switch)

The switch setting definitions for the new 9153A are not currently in available in any service documentation. There is information in the new owners manual PN 09153-90005.

Solution:

The following table describes the volume settings on 9153A's serial prefix 2702A and above.

Setting	Number of Volumes	Volume Sizes (MByte/Volume
0	This setting allows initialization of existing volumes. On a disc which has not been initialized, the hard disc is initialized as 1 10 MByte volume. (Same as setting 1)	
1	1	One 10 MByte volume
2	2	Two 5 MByte volumes
3	3	Three 3.32 MByte volumes
4	4	Four 2.49 MByte volumes

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5	5	Five 2.0 MByte volumes
6	6	Six 1.66 MByte volumes
7	2	Volume 0 = 3.01 MByte and Volume 1 = 7.02 MByte
8	Prevents writing to the first volume of the hard disc Prevents accidental re-initializing of the hard disc	
9	Prevents accidental re-initialization of the hard disc	

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SERVICE NOTE

9154A

DISC DRIVE

Serial number:
ALL PREFIX 2451A

POSSIBLE DATA LOSS ON 3.5 INCH WINCHESTER

Supersedes: NONE

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: X On Failure:	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:	X		
SERVICE INVENTORY:	Return for Update: X		Use as is:
	Return for Salvage:		See Text:
WARRANTY EXTENDED UNTIL:			MAY 1 1986

Situation:

It is possible when writing to the 3.5 Inch Winchester to overwrite the header on an adjacent physical record of the disc. The corrupted record may not be used in the write operation being performed, which means that a failure might not be reported until an access is attempted to the corrupted record. If the failure occurs while updating the directory, the drive would have to be reinitialized before it would be accessible. The failure has only been seen when performing a DMA transfer with a series 200 with a high speed interface and processor. We can not guarantee that the failure will not occur on all other present and future configurations.

Solution:

The E-PROMs are being updated to guarantee the hard disc controller chip is in a known state when the sector address is passed to it. The part number of the new E-PROMS will be 09153-89105 and 09153-89205. Units which have had the firmware updated to correct this problem will have Serial Number prefix 2520A or higher. Less than 25 units were shipped with earlier revision firmware.

Warranty:

Units which have the problem described will also have a possibility of having the drive defect described in service note 9154A-2. As both these situations require immediate update and the update would be extremely costly in the field, units which have Serial Number prefix 2451A will be warranty replaced. If a 9154A with Serial Number prefix 2451A is found, contact Greeley Division on-line

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service support to arrange a warranty replacement. The telephone number is 303-350-4453.

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SERVICE NOTE

Supersedes: NONE

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: X On Failure:	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:	X		
SERVICE INVENTORY:	Return for Update: X		Use as is:
	Return for Salvage:		See Text:
WARRANTY EXTENDED UNTIL:			May 1 1986

9154A

DISC DRIVE

Serial number:
ALL SERIAL PREFIX 2450A

Potential Failures of 3.5 Inch Winchester Mechanism PN09153-69101

Situation:

9154A Disc Drives with serial number prefix 2451A were shipped with winchester mechanisms which can exhibit two known failure modes.

1: An accelerator which was used to speed curing time of an adhesive has been found to "outgas" over time and leave deposits on the media which can cause a "stiction" problem. (head sticks to the media) The drive will either time-out or the head will be damaged or broken off.

2: One of the interconnect wires between spindle motor coils may short to a mounting screw on these units, causing overheating and eventually an open circuit.

Solution

Units with serial number prefix 2520A and higher have winchester drives which did not use the accelerator and the routing of the motor wiring has been modified to ensure that no possibility of a short exists. The exchange part number of drives which will not have these problems is being changed to 09153-69111. Return all service inventory of Drive PN09153-69101 and reorder PN09153-69111. Approximately 35 service assemblies and less than 150 customer units were shipped which may exhibit these problems.

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Warranty

Units with the drive problems described also have the possibility of having the controller problem described in service note 9154A-1. As both these situations require immediate update and the update would be extremely costly to perform in the field, units with serial prefix 2451A will be warranty replaced. If a 9154A with serial number prefix 2451A is found, contact Greeley Division on-line service support to arrange a warranty replacement. The telephone number is 303-350-4453.

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SERVICE NOTE

Supersedes: NONE

9154A

DISC DRIVE

Serial number:
ALL

09154-69502 DATE CODE 2524 AND EARLIER: POTENTIAL +12 VOLT SHORT

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure: X	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	X		
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is:
	Return for Salvage:		See Text: X
WARRANTY EXTENDED UNTIL:	08/01/86		

Situation:

Controller PCA PN09154-69502 is held in place by metal PC guides which are part of the 9154A chassis. The 12 Volt trace on this assembly runs close to the edge of the board which the chassis guides support. If the solder resist on this trace flakes off, the potential for a 12 Volt short exists. Solder adhering to an exposed section of the 12 Volt trace increases the risk of a short. The 12V fuse on the power supply will blow if this trace shorts to the chassis.

Solution:

Controller boards with date code 2525 and later have 1/2 Inch electrical tape over the 12V trace. (Ref. Fig. 1) If a 12V fuse problem is found in a 9154A, inspect the 09154-69502 PCA to ensure that these traces have been covered with tape per Fig. 1. Tape PN0460-0193 has been approved for use in this application.

Warranty:

Greeley Division will accept 1 hour labor on extended warranty when a Controller PCA PN09153-69502 is modified to correct a 12V fuse problem. All service inventory shipped was date code 2525 and later.

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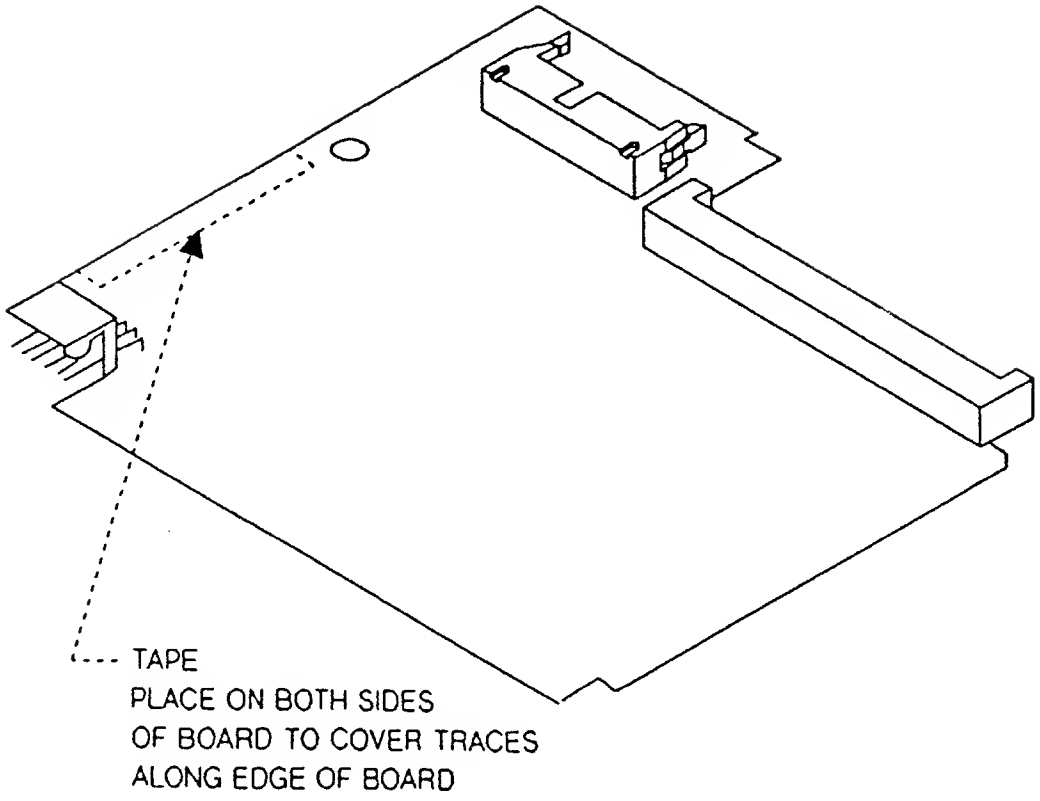
TAPE
PLACE ON BOTH SIDES
OF BOARD TO COVER TRACES
ALONG EDGE OF BOARD

FIGURE 1

SERVICE NOTE

9154A

DISC DRIVE

Serial number:
ALL

Part Number for Controller PCA 09154-69502 changes to 09153-69502

Supersedes: NONE

APPLIES TO:	All Units ■	Only Units on Agreement □
PERFORM:	Immediately □	At PM/Normal Call □
	On Failure □	Information Only ■

WARRANTY:	**EXTENDED**	**NORMAL**	**NONE**
LABOR:			X
PARTS:			X
TRAVEL:			X

SERVICE INVENTORY	Return for update □	Use as is ■
	Return for salvage □	See text □

WARRANTY EXTENDED UNTIL: N/A

Situation:

Controller PCA PN 09154-69502 is a partly loaded 09153-69502 Controller PCA. To reduce inventory and handling, Controller PCA PN 09153-69502 will be used in both the 9153A and 9154A.

Solution:

All F.S.I. will be used until gone. When the new board inventory of the 09154-69502 is gone, the parts price list will be updated to reflect the new part number.

Warranty:

This service note does not have warranty implications. Both controllers are functionally identical when used as a repair part in a 9154A.

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09/26/85

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SERVICE NOTE

9154A

Disc Drive

Serial number:
All

50 Hz Interference from 9154A Transformer to Display of Touch Screen II

Supersedes: None

APPLIES TO:	All Units ■		Only Units on Agreement □
PERFORM:	Immediately □		At PM/Normal Call □
	On Failure ■		Information Only □
WARRANTY:	**EXTENDED**	**NORMAL**	**NONE**
LABOR:	X		
PARTS:	X		
TRAVEL:			X
SERVICE INVENTORY	Return for update □		Use as is ■
	Return for salvage □		See text □
WARRANTY EXTENDED UNTIL:	January 1987		

Situation:

The CRT refresh rate of the Touch Screen II makes it very susceptible to interference when used in countries with 50 Hz power line frequency. The 9154A can cause CRT distortion when used with the Touch Screen II in these countries.

Solution:

A new transformer, which reduces distortion of the Touchscreen II CRT, is being used in units which have the 50 Hz power option. The 9154A Serial Number prefix will not be changed because all units will not use this transformer immediately. Option 903 (U.S. power cord) will continue using the original transformer to reduce scrap at GLD.

HP Part Number of original transformer = 9100-4419 (Possible distortion in 50 Hz applications)

HP Part Number of new transformer = 9100-4488

If a customer complains of CRT distortion on the TouchScreen II in areas with 50 Hz power, replace transformer PN 9100-4419 with PN 9100-4488 after verifying the 9154A as the source of the interference.

Warranty:

Greeley Division will accept 1 hour labor and parts cost when a customer complains of CRT distortion on his Touchscreen II in a country with 50 Hz power.

Note: Travel not allowed unless system has on-site warranty.

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10/28/85

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SERVICE NOTE

9154A

Disc Drive

Serial number:
All

Power Supply Failure Weakens or Damages Other Assemblies

Supersedes: None

APPLIES TO:	All Units ■		Only Units on Agreement □
PERFORM:	Immediately □		At PM/Normal Call □
	On Failure ■		Information Only □
WARRANTY:	**EXTENDED**	**NORMAL**	**NONE**
LABOR:	See text		
PARTS:	See text		
TRAVEL:	See text		
SERVICE INVENTORY	Return for update □		Use as is ■
	Return for salvage □		See text □
WARRANTY EXTENDED UNTIL:	See text		

Situation:

A power supply failure has been seen that applies 30 Volts to the 12 Volt line of the 9154A. In all cases this failure mode has also caused damage to the 3.5 inch winchester mechanism. In addition, components of the 3.5 Inch flexible drive, the fan and the main controller PCA are stressed above their design limits. The failure mode has been, "the fan running at a greatly accelerated rate" and "a loud pop and the smell of smoke". In cases where these symptoms or other component damage occurs in conjunction with a defective power supply, the +12 Volt test point on the power supply should be checked. If approximately 30V is present at this point, the following assemblies need to be changed to assure the product will not fail at a later date due to stressed components.

1. Controller PCA PN09153-69502 or 09154-69502
2. Power Supply PN09153-69501
3. 3.5 Inch Winchester Drive PN09153-69111
4. Fan PN09125-68500

Solution:

The extent of the damage involved when the power supply fails in this manner makes the repair impractical to perform in the field. The repair cost would be higher than the manufacturing cost of a new unit. In cases where +12 Volts has been verified to be at approximately +30 Volts, Greeley Division will authorize a warranty replacement for the customer unit. Contact the Greeley Division Support line, telephone 303-350-4453, to get instructions for obtaining a replacement unit.

Warranty:

As Greeley Division is absorbing the labor and material costs associated with this failure by replacing the unit, no other extended warranty applies.

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SERVICE NOTE

9154A

Disc Drive

Serial number:
All

Format Option Information For Using Exerciser Tape PN5010-0310 to Initialize a 9154A

Supersedes: None

APPLIES TO:	All Units: X		Only Units on Agreement/Warranty:
PERFORM:	Immediately: On Failure:		At PM/Normal Call: Information Only: X
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is: X
	Return for Salvage:		See Text:
WARRANTY EXTENDED UNTIL:	NA		

Situation:

The Initialize routine accessible in the Service sub-program of the SS/80 Exerciser tape, PN5010-0310, requires 1 of 3 spares table options to be selected before the initialization is performed. Option 2 clears both the factory and field spares tables. The information in the field spares table is created at the factory and cannot be recreated in the field.

Solution:

Format option 2 should never be selected when initializing a 9154A. If format option 2 is selected, the drive has to be returned as defective. Option 0 (Initialize retaining all spares information) or 1 (Initialize clearing field spares information, but retaining all factory spares information) are the only options which should be used on this product. Option 2 is not selectable through any standard HP operating system. The SS/80 Exerciser and any customer written mass storage driver are the only possible problem areas. An additional Initialize utility in the Manual subprogram of the SS/80 Exerciser tape initializes the winchester drive using option 0.

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03/24/86

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SERVICE NOTE

9154A

Disc Drive

Serial number:
NA

3.5 Inch Disc Drive PN 09153-69111
Changes to 09153-69121

Supersedes: None

APPLIES TO:	All Units ■		Only Units on Agreement/Warranty ☐
PERFORM:	Immediately ☐		At PM/Normal Call ☐
	On Failure ☐		Information Only ■
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE	Return for update ☐		Use as is ☐
INVENTORY	Return for salvage ☐		See text ■
WARRANTY EXTENDED UNTIL: N/A			

Symptom:

Some 3.5 Inch Winchester Drives, PN09153-69111 may fail to spin up at power-on. The host will report an error message indicating that the drive cannot be found or that it is unable to access the drive. The exact error message received is dependent on the host computer used. The failure mode can also be recognized by listening to determine if the motor is actually spinning up.

Cause:

3.5 Inch Winchester drives with electrical date code 2521 or lower were manufactured using a lubricant that can outgas or migrate into the head/media chamber under certain circumstances. This can leave a residue on the disc surface that can cause the head to adhere to the surface, prohibiting the motor from spinning. A substantial outgassing is required to cause a functional problem. Customer units that have had this problem have been early failures. The drives which were manufactured with this lubricant can also be identified by a serial number located on a bar code label on the side of the mechanism. Units with Serial 9000 and above or electrical date code 2537 and above did not use the lubricant anywhere in the manufacturing process.

Solution:

Inspect all F.S.I of PN09153-69111. Return all units with electrical revision date code 2521 and lower or serial number 8999 and lower and reorder PN09153-69121. F.S.I with date code 2537 or serial numbers 9000 and higher should be relabeled with PN 09153-69121 and returned to F.S.I.

The failure has occurred at delivery or very shortly after on customer units. Therefore, no installed base action is planned.

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If this failure occurs on a customer unit where it is important to attempt to recover the customer data, it is possible to break loose the motor and attempt to back up the data. A non-conductive tool can be inserted into the opening of the drive opposite the bar code label and used to break loose the motor by forcing the finned part attached to the motor to spin. This should be done with power applied to the unit. **Use caution as the motor will spin up to speed rapidly once the head/media adhesion is broken.**

SERVICE NOTE

9154A

3.5 Inch Winchester Disc Drive

Serial number:
2703A and Above

New Assembly Part Numbers

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only: X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is:
	Return for Salvage:		See Text: X
WARRANTY EXTENDED UNTIL:	NA		

Situation:

Starting with Serial Prefix 2703A, the 9154A will be manufactured with all new assemblies. With the exception of a controller jumper setting and factory recorded servo information on the 3.5 inch winchester mechanism the new assemblies are the same as are being used in the manufacture of the 9154B.

To minimize field stocking requirements the exchange drive for the new 9154A will be the same as is required for the 9154B. 9154A's with serial prefix 2703A and higher require the same repair assemblies as the 9154B.

Solution:

Reference the table below for part numbers for assemblies required to service the 9154A.

	Prefix 2515 and Lower	Prefix 2702A and Higher
Controller PCA	09153-69502	09153-69520 (Includes HP-IB)
Winchester Mechanism	09153-69121	45816-69111
HP-IB Board	09153-67503	NA
Power Supply	09153-67501	09153-67110
	Reference Service Manual PN5958-4122 for additional PN information.	Reference 9153B Service Manual Insert PN5958-4122 for Additional PN information.

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04/03/87

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SERVICE NOTE

9154A

Disc Drive

Serial number:
Prefix 2703A and Above

Volume Configuration Settings

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only:X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:	Use as is:X	
	Return for Salvage:	See Text:	
WARRANTY EXTENDED UNTIL:			

Situation:

9154A Disc Drives with serial number prefix 2703A and above have a volume configuration switch setting accessible on the back of the unit. Units with lower prefixes had a 4 position DIP switch located on the HP-IB personality module to allow 4 volume partition options. (Reference pages 3-7 and 3-8 of the 9153A Service Manual PN5958-4122 for a description of this switch)

The switch setting definitions for the new 9154A are not currently in available in any service documentation. There is information in the new owners manual PN 09153-90005.

Solution:

The following table describes the volume settings on 9154A's serial prefix 2703A and above.

Setting	Number of Volumes	Volume Sizes (MByte/Volume
0	This setting allows initialization of existing volumes. On a disc which has not been initialized, the hard disc is initialized as 1 10 MByte volume. (Same as setting 1)	
1	1	One 10 MByte volume
2	2	Two 5 MByte volumes
3	3	Three 3.32 MByte volumes
4	4	Four 2.49 MByte volumes

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5	5	Five 2.0 MByte volumes
6	6	Six 1.66 MByte volumes
7	2	Volume 0 = 3.01 MByte and Volume 1 = 7.02 MByte
8	Prevents writing to the first volume of the hard disc Prevents accidental re-initializing of the hard disc	
9	Prevents accidental re-initialization of the hard disc	

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05/18/87

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SERVICE NOTE

9153B

20 Mbyte Winchester/3.5-in Flexible Disc

Serial number:
ALL

Winchester disc drive replacement

Supersedes: NONE

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only: X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:	Use as is: X	
	Return for Salvage:	See Text:	
WARRANTY EXTENDED UNTIL:	N/A		

Situation:

1. The 45816-69111 exchange drive assembly is used to service the 45816A (Vectra 20 Mbyte subsystem) with serial number prefix 2552A or higher in addition to the 9153B.

   If an exchange drive is installed in the 9153B and formatted, that drive cannot then be used in the 45816A as the formatting in the 9153B has destroyed information on the drive which is required by the 45816A.

2. When a 9153B is powered up following installation of an exchange drive the FAULT light will remain on indicating a power-on selftest failure. FORMAT/INITIALIZE the drive with an appropriate computer or the SS/80 Exerciser (HP 85), then cycle power OFF and ON to clear the FAULT indication.

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09/23/86

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SERVICE NOTE

9153B

20 Mbyte Hard Disc, 3 1/2 Inch Double Sided Floppy

Serial number:
FSI Only

Controller PCA Part Number 09153-69510 Changed to 09153-69520.

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: X On Failure:	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	See Text		
PARTS:	See Text		
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:	Use as is:	
	Return for Salvage:	See Text: X	
WARRANTY EXTENDED UNTIL:	N/A		

Situation:

A firmware bug has been found on the 9153B/4B controller board, exchange part number 09153-69510. If a user formats a microfloppy disc and the disc has a defective track which is spared out, the disc will operate normally until ejected. After being ejected the first time this disc will appear to be unformatted and all data will be inaccessible on any disc drive.

Note:

NO UNITS have been shipped to customers with this bug, ONLY FSI is affected.

Solution:

Rework all 09153-69510 exchange boards to 09153-69520. These boards can be reworked in the field by ordering kit part number 09153-89901 and following the instructions in the kit. The kit contains two new EPROMs, instructions, and a label to change part number to 09153-69520.

Warranty:

GLD (5800) will pay for 1/4 hour labor and part number 09153-89901 to rework exchange part number 09153-69510.

RP
11-10-86

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SERVICE NOTE

9153B

Winchester\3 1/2 Inch Floppy Disc Drive

Serial number:
All

New shipping disc

Supersedes: N/A

APPLIES TO:	All Units: X	Only Units on Agreement:	
PEPFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only: X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is:
	Return for Salvage:		See Text: X
WARRANTY EXTENDED UNTIL:	N/A		

Situation:

There is a new improved shipping disc available for the 3 1/2 Inch floppy disc drives. This new shipping disc has a disc lock attached to the plastic shipping disc which eliminates the need for the rubber wedge (9223-0648) required on the old shipping disc (1535-4881).

Solution:

The new shipping disc will have part number 1150-1787 and will be available approximately Mar 1, 1987 from CPC and PCE. The old discs and wedges will be available until the stock is depleted. There will be NO upgrade, users must purchase the new shipping discs if needed.

9153B's shipped approximately Mar 15, 1987 will have the new shipping disc.

RP
2-25-87

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SERVICE NOTE

9153B

3.5 Inch Disc Drive

Serial number:
2647A02233 and Lower

Power On Self Test Failure

Supersedes: None

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure: X	At PM/Normal Call: Information Only:	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	X		
PARTS:	X		
TRAVEL:	See Text		
SERVICE INVENTORY:	Return for Update:	Use as is:	
	Return for Salvage:	See Text: X	
WARRANTY EXTENDED UNTIL:	June 1 1988		

Situation:

9153B Disc Drives with serial numbers 2647A02233 and lower will fail power on self test or the initiate diagnostic command if a flexible disc formatted with 1024 Byte sectors is inserted during these operations.

During power on self test and initiate diagnostic execution, a sector is read from the flexible disc (if inserted) and stored in a RAM buffer. Controller PCA PN09153-69520 with EPROM's 09153-89109/89209 or lower only allocate 512 Bytes of RAM to store this information. If a flexible disc which has been formatted with 1024 Byte sectors is inserted in the 9153B during these operations, the 9153B attempts to store 1024 Bytes. This overwrites system information causing the unit to hang. If the disc is removed from the flexible disc drive before power-on, further operations can be performed normally.

Solution:

Controller PCA PN09153-69530 has a firmware change which does a CRC Byte compare during this operation and does not store any data in RAM. This corrects the problem.

This problem only occurs if the flexible disc is formatted with 1024 Byte sectors and is inserted during power up self test or when an Initiate Diagnostic command is issued.

A firmware upgrade kit PN09153-89902 is set up at CPC/PCE to allow field upgrade of F.S.I. The kit contains EPROMs PN09153-89110 and 89210, an instruction sheet and a 09153-69530 PN label to identify upgraded assemblies.

Customer units should be upgraded on failure only. The firmware will not solve any problems unless the customer is using flexible discs that have been formatted with 1024 Byte sectors. The most common useage of 1024 Byte sectors on the flexible disc is in UNIX sytems.

Warranty:

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05/11/87

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SERVICE NOTE

9154B

20 Mbyte Winchester Disc

Serial number:
ALL

Winchester disc drive replacement

Supersedes: NONE

APPLIES TO:	All Units: X	Only Units on Agreement:	
PERFORM:	Immediately: On Failure:	At PM/Normal Call: Information Only: X	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE INVENTORY:	Return for Update:		Use as is: X
	Return for Salvage:		See Text:
WARRANTY EXTENDED UNTIL:	N/A		

Situation:

1. The 45816-69111 exchange drive assembly is used to service the 45816A (Vectra 20 Mbyte subsystem) with serial number prefix 2552A or higher in addition to the 9154B.

   If an exchange drive is installed in the 9154B and formatted, that drive cannot then be used in the 45816A as the formatting in the 9154B has destroyed information on the drive which is required by the 45816A.

2. When a 9154B is powered up following installation of an exchange drive the FAULT light will remain on indicating a power-on selftest failure. FORMAT/INITIALIZE the drive with an appropriate computer or the SS/80 Exerciser (HP 85), then cycle power OFF and ON to clear the FAULT indication.

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PRODUCT HISTORY

CHAPTER 11

[1] HISTORY

This is the second printing of service information for the 3 1/2-inch Winchester Disc Drive as it applies to the HP 9153/54 A and B products.

This section of the manual is complete and applies to all 9153/54 A and B units now in the field. Applicable serial numbers are as follows:

HP 9153A - serial numbers prefixed by 2450A and higher.
HP 9154A - serial numbers prefixed by 2451A and higher.
HP 9153B - serial numbers prefixed by 2633A and higher.
HP 9154B - serial numbers prefixed by 2634A and higher.

[2] SERVICE NOTE HISTORY

The service notes issued against the HP 9153/54 A and B products are provided in Chapter 10 of this manual. The following tables show the service notes that have been issued at the time of this printing.

Service Notes for the HP 9153A

Service Note Number	Description	S/N Prefix	Affected Part
9153A-1	New ROMS (possible data loss)	2515A and below	09153-89105 09153-89205
9153A-2	Winchester Failures	2515A and below	09153-69101
9153A-3	Shipping Disc	2515A and below	1535-4881
9153A-4	Potential +12 Volt short	2515A and below	09153-69502
9153A-5	Floppy head damage	2515A and below	1535-4881
9153A-6	50HZ Interference with HP 150	2515A and below	9100-4488
9153A-7	Power Supply failure	2515A and below	9153A
9153A-8	SS/80 Exerciser	2515A and below	5010-0310
9153A-9	New 3 1/2-inch Winchester	2515A and below	09153-69121
9153A-10	New Shipping Disc	2515A and below	1150-1786/1787
9153A-11	New 9153A	2702A and above	9153A
9153A-12	Power-on Selftest Failure	2702A 1800 to 1992	09153-69530
9153A-13	Volume Configuration switches	2702A and above	9153A

Service Notes for the HP 9154A

Service Note Number	Description	S/N Prefix	Affected Part
9154A-1	New ROMS (possible data loss)	2451A	09153-89105 & 89205
9154A-2	Winchester Failures	2450A	09153-69101
9154A-3	Possible +12 Volt short	2515A and below	09153-69502
9154A-4	New Controller PCA	2515A and below	09153-69502
9154A-5	50HZ interference with HP 150	2515A and below	9100-4488
9154A-6	Power Supply failure	2515A and below	9154A
9154A-7	SS/80 Exerciser	ALL	5010-0310
9154A-8	New 3 1/2-inch Winchester	2515A and below	09153-69121
9154A-9	New 9154A	2703A and above	HP 9154A
9154A-10	Volume configuration switchs	2703A and above	HP 9154A

Service Notes for the HP 9153B

Service Note Number	Description	S/N Prefix	Affected Part
9153B-1	Winchester format information	All	45816-69111
9153B-2	New firmware	FSI only	09153-69520
9153B-3	New shipping disc	All	1150-1787
9153B-4	Power-on Selftest failure New firmware	2647A 02233 and lower	09153-69530

Service Notes for the HP 9154B

Service Note Number	Description	S/N Prefix	Affected Part
9154B-1	Winchester format information	All	45816-69111

CHAPTER 12

DIAGRAMS

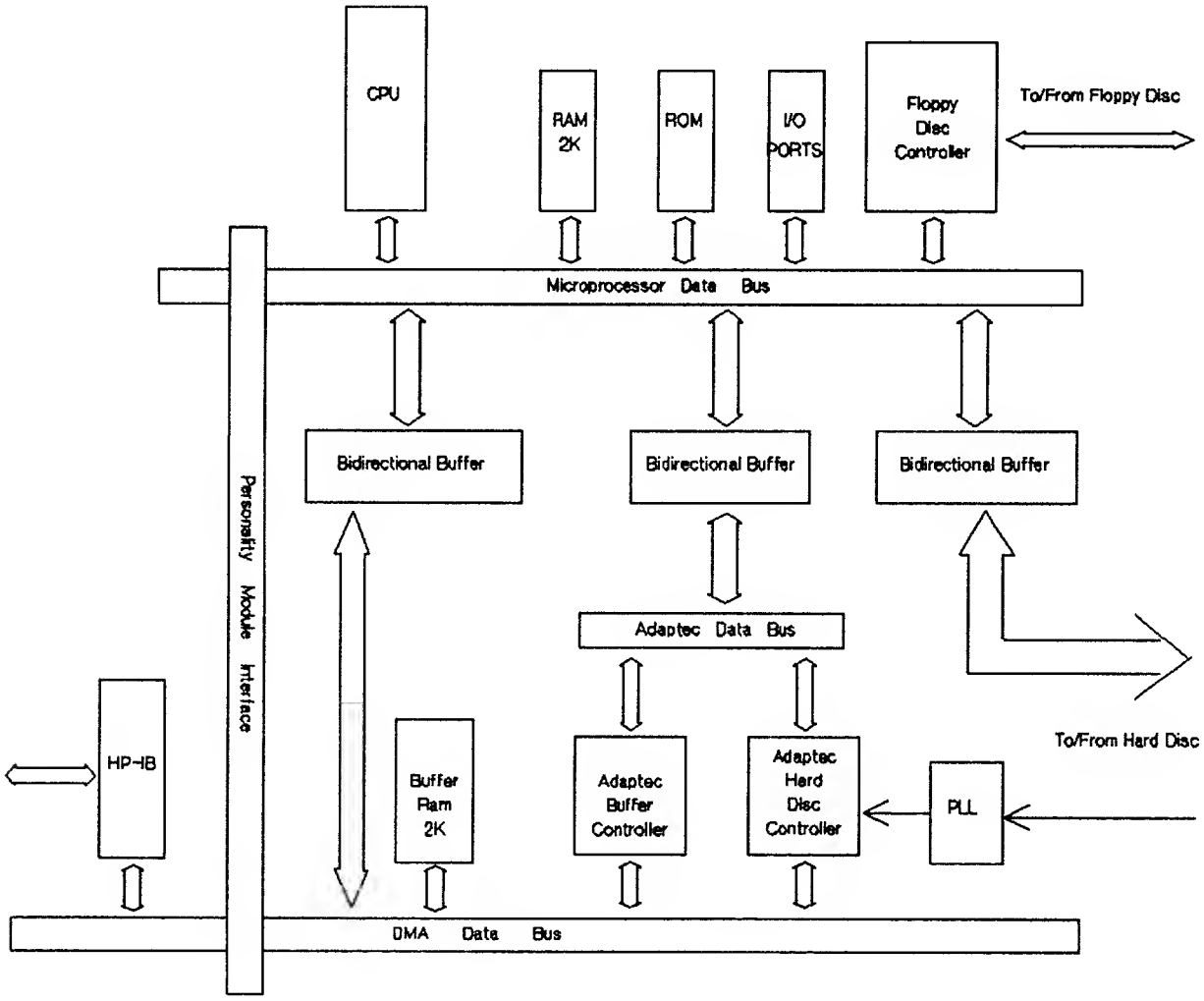

Figure 12-1. Block diagram for HP 9153/54A S/N Prefix 2515A and below.

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